MONTHLY WEATHER REVIEW,

DECEMBER, 1877.

WAR DEPARTMENT,
Office of the Chief Signal Officer,
DIVISION OF
TELEGRAMS AND REPORTS FOR THE BENEFIT OF COMMERCE AND AGRICULTURE.

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INTRODUCTION.

In compiling the present REVIEW the following data, received up to January 14th, have been made use of, viz: the regular tri-daily weather charts, containing the data of the simultaneous observations taken at one hundred and twenty-eight Signal Service stations and twelve Canadian stations; monthly journals and means from one hundred and thirty-four of the former, and means from thirteen of the latter; two hundred and thirty-eight monthly reports from Volunteer Observers; forty-two monthly reports from United States Army Post Surgeons; Marine Records; reliable newspaper extracts; special reports. The most noticeable features for the month are: the severe storms Nos. II and XV; the small number of high pressure areas; the high average temperatures for all the districts; the heavy rains accompanying storms Nos. II, XI and XV; few auroras; frequency of lunar halos during the middle of the month.

BAROMETRIC PRESSURE.

In General.—A comparison of the isobarometric curves on chart No. II with the average for December for a number of years, shows the following, viz: for the present month the pressure, as reduced to sea-level, has averaged slightly below that for a number of years along the Pacific coast, in Utah, at Key West, in the Upper Mississippi and Lower Missouri valleys, and at Breckenridge 0.11 of an inch. For the Upper Lake region, Ohio valley, Tennessee and West Gulf States, it varies from slightly below to slightly above. In the East Gulf and Atlantic States and Lower Lake region, it averages above—at Oswego and Burlington, about 0.11 of an inch.

The local barometric ranges for the month have been as follows: *Large*—Norfolk, 1.50 in.; Eastport, 1.47; Cape Henry, 1.45; Atlantic City, Cape May and Cape Lookout, 1.41; Wood's Holl, 1.40; Newport, 1.35; Boston and New London, 1.34; Barnegat, 1.33; Portland, Me., Thatcher's Island, Wilmington and Smithville, 1.30; and from New England to eastern Tennessee and northern portions of Alabama, Georgia and South Carolina, the range has exceeded 1.20. *Small*—Los Angeles, 0.61 in.; Visalia, Cal., 0.62; Santa Fe, 0.63; Pioche, Nev., 0.65; San Francisco, 0.66; Salt Lake City, 0.68; Key West, 0.70; Sacramento and Pike's Peak, 0.73; Cheyenne, 0.76; Denver, 0.79; Red Bluff, Cal., 0.80; Winnemucca, Nev., and Boise City, Idaho, 0.81; Jacksboro, Texas, 0.82; Fort Gibson and Toledo, 0.86; Shreveport, 0.88; Indianapolis and Chicago, 0.89.

Areas of High Pressure.—Of these six have been traced and are described. This number is smaller than is usual for the month of December, and to which fact can be partly attributed the high average temperatures in the different districts. Two, Nos. IV and V, crossed the country north of the Lakes, and were accompanied in New York and New England by severe, cold weather. Four took a southerly path, producing high northwesterly winds and gales as they advanced south and eastward from the Rocky Mountain region, and in the Gulf States "northers."

No. I.—At 7:35 a. m., Washington time, of the 1st, this high-pressure area, (described as No. VI in the November REVIEW,) covered the Southwest; barometer, 30.48 inches at Shreveport, and 0.41 inch above the normal at Indianola. Excepting the southern portions of Texas and Florida, and from California to the western part of Washington Territory, the minimum temperature had fallen below freezing the preceding night over the whole country, and below zero from southeastern Dakota to the Red River of the North valley. During the day clear weather generally prevailed over the country east of the Rocky Mountains, excepting light snows from the Ohio and Upper Mississippi valleys to the Lakes. A second high-pressure area advanced southeastward toward New York and New England, and united with it at night. Morning of the 2nd the barometer was highest, 30.54 in., at Cairo, with the barometric ridge extending from Louisiana northeastward over the Middle States to northern New England. Brisk to high northerly winds were produced from the New Jersey to the North Carolina coasts during the day, but with generally clear weather. By morning of the 3rd the central highest pressure had moved to the North Carolina coast, 30.60 at Norfolk and 0.48 in. above the normal at Kittyhawk, N. C., with continued cold and clear weather in the Middle and New England States, but rising temperature thence south and westward. During the 3rd and 4th it gradually disappeared off the North Carolina coast, in advance of storm No. II.

No. II.—During the 3rd it was observed along the Pacific coast, succeeding low pressure No. I. By morning of the 4th the barometer at Portland, Or., was reported as 30.55 and 0.42 above the normal. Moving south and eastward during the day, it reached from Arizona and New Mexico to eastern Washington Territory and Montana on the morning of the 5th—0.32 above the normal at Salt Lake City. Northerly gales extended southward on the 4th and 5th from Wyoming and Dakota to the West Gulf States; maximum velocities: Cheyenne, NW. 34, Pike's Peak, NE. 55, North Platte, NW. 72, Denver, N. 60, Dodge City, N. 44, Fort Sill, NW. 42, Omaha and Denison, NW. 36, Indianola, N. 46, and Galveston, NW. 43 miles per hour. At 7:35 a. m. of the 6th it was central in western Texas; highest 30.65 at Brownsville, with temperatures below freezing, except on the immediate coast. Morning of the 7th isobar 30.50 included the Gulf States, Tennessee, and the larger portion of the South Atlantic States. During the 7th, as low-pressure area No. III passed eastward, this high area moved westward, united with a second, and the following morning reached from southern Dakota to Louisiana and Mississippi. At 7:35 a. m. of the 9th the highest covered Tennessee, 30.51 at Knoxville, but 0.37 above the normal at Detroit and Cleveland. Brisk to high northerly winds were produced from the New Jersey to the North Carolina coasts; at Kittyhawk, N. 40, Cape May, NW. 36, and Sandy Hook, NW. 35. In advance of low pressure No. IV, it moved eastward, and later southward. It was central over South Carolina on the morning of the 10th, over the central Gulf States on the 11th, 12th and 13th, after which it lost its identity. It is quite probable that during the nights of the 7th and 10th its effect was increased by high-pressure areas, which advanced from the west or northwest and united with it, as shown by the barometric deviations from the normals.

No. III.—Apparently advanced southeastward over Montana and Dakota, during the 12th, towards New Mexico and Texas. On the morning of the 13th the highest reached from Dakota to northern Texas, and New Mexico—0.41 inches above normal at North Platte—with cold, clear weather. At 7.35 a. m., 14th, isobar 30.50 included the Ohio valley region, with very generally cold, clear weather in the districts east of the Rocky Mountains, excepting occasional light rains in southern Texas. In connection with storm No. VI, north to west gales were produced the 13th and 14th from the Lower Lakes to the Atlantic coast, as far south as North Carolina. Morning of the 15th the highest, 30.50, was central in the Carolinas. As low pressure No. VII progressed eastward, it moved southwestward over the East Gulf States by the following morning, and with diminished pressure. During the 16th, 17th, and 18th, it gradually disappeared in that district.

No. IV.—It first became perceptible on the afternoon of the 16th in Manitoba by a sudden rise in the barometer and winds shifting to cold northerly. It rapidly extended southeastward on the 17th, with cold northerly winds, N. E. 32 miles at Duluth, and generally clear weather. By the morning of the 18th it was central north of New York; highest barometer 30.73 at Kingston, Canada, and 0.60 above the normal at Burlington. In the St. Lawrence valley the temperature fell to about 10° Fah., and the isotherm 20° included Nova Scotia and the larger portion of New England and New York. Afternoon of the 18th the pressure rose 0.74 above the normal at Eastport. Brisk and high northerly winds accompanied its advance in the Lower Lake region, St. Lawrence valley and New England, and high northwest veering to northeast winds from New Jersey to North Carolina; maximum velocities, Oswego, N. 32, Quebec, NW. high, Eastport, N. 33, Thatcher's Island, NE. 36, Sandy Hook, NE. 33, Cape May, NE. 32, Cape Henry, NE. 34, and Kittyhawk, NE. 31 miles. Morning of the 19th isobar 30.50 reached from the Middle Atlantic coast to Nova Scotia. During the day it apparently progressed southwestward along the coast, but with decreased pressure, under the influence of a minor depression passing eastward north of the St. Lawrence valley.

No. V.—At midnight of the 19th the pressure was observed increasing at the stations along Lake Huron. Morning of the 20th it was central northeast of that Lake; highest 30.43 at Rockliffe, Canada By midnight isobar 30.60 included the Ottawa and St. Lawrence valleys, and northern portion of New England. At 7:35 a. m., 21st, the barometer at Father Point, Canada, read 30.74, and the minimum temperature at 0°. Brisk to high northerly winds accompanied its advance in the St. Lawrence valley and New England in conjunction with low pressure No. X, and extended as northeasterly winds to the Middle Atlantic and North Carolina coasts. The barometer at Eastport was 0.70 in. above the normal afternoon of the 21st. During the night the temperature fell below zero in New Brunswick. The pressure continued highest over the St. Lawrence valley on the 22nd, 23rd and 24th, but decreased in advance of storms Nos. XII, XIII and XIV.

No. VI.—During the 24th the pressure rose somewhat above the normal from Montana and Dakota to Utah and western Kansas. By morning of the 25th the highest was probably north of Dakota, and continued so during the 26th and 27th. A storm was crossing the Rocky Mountain region from California, and No. XII and XIII were in the Southern States. At 7:35 a. m. of the 28th the barometer was high and considerably above the normal from the St. Lawrence valley to Lake Superior, and from Dakota to Utah, Oregon and Washington Territory, but still highest in Manitoba, and increasing to 30.46 at Ft. Garry by midnight. As storm No. XV advanced northeastward, this high area moved southward. It was central over Dakota and Nebraska on the morning of the 30th, with temperatures below zero in Wyoming, Utah, and western Nebraska, and below freezing as far southward as the interior of Texas. The following morning isobar 30.30 included the country from Texas to southern Dakota, and at midnight the highest was central in Texas. During the 28th and 29th high northerly winds and gales extended southward from Nebraska and Kansas to the Texas coast as a severe "norther," and to Florida and Cuba by the 30th; Dodge City N. 36; North Platte, Ft. Gibson and Denison N. 28. At Indianola extraordinary low tide was produced.

Areas of Low Pressure.—Of these fifteen are described, all of which have been charted but the first. Broken lines indicate the probable paths of the centres of the disturbances. By means of the deviations of the barometric readings, as corrected for temperature and instrumental error, from the means for the month and the observation, (7:35 a. m., 4:35 p. m., or 11.00 p. m, Washington time,) these areas of low pressure can be traced across the elevated country between the Pacific coast and Mississippi valley. No. II, IX. XI. XII, XIII and XV were accompanied by heavy rains and occasional thunder-storms. The most severe were Nos. II and XV.

No. I.—During the 1st this low-pressure area appeared in Manitoba, and passed eastward to the north of the Lake region on the 2nd. The 3rd light snows fell in the St. Lawrence valley, but the centre of the depression was at some distance to the northward, and therefore not charted.

No. II.—This storm can be traced to the Pacific coast. On the 1st rain was occasionally reported from California to Washington Territory. On the 2nd and 3rd light rains and snow fell in Arizona, Utah and New Mexico, with brisk and occasionally high winds; on Pike's Peak, SW. 56, and at San Diego, N. 30, the 2nd. Morning of the 3rd it was central north of Santa Fe. By midnight the rain-area had extended to the Mississippi valley, with increasing southeasterly winds, but changing to snow in western Nebraska and Kansas, with high northwesterly winds. Its course, previously southeastward, during the day was northeastward toward the Upper Lakes. At Dodge City and North Platte, the barometer fell 0.40 of an inch below the normal. Thunder-storms occurred in Texas, Indian Territory and Kansas. During the 4th rainy weather extended to the Atlantic coast, with occasional thunder-storms in Illinois and Michigan; snow fell from Nebraska to Dakota and Manitoba; clearing weather was reported from Texas to southern Nebraska, with brisk and high west to north winds; the central pressure continued diminishing, falling 0.72 below the normal at La Crosse. The 5th occasional thunder-storms were reported from Kentucky, Tennessee and Florida. The centre passed into Canada, with a barometric trough extending southward to the Gulf, to the eastward of which rainy weather and southerly gales veering to westerly prevailed; to the westward, brisk and high west to north winds, with the rain turning into light snow as far south as Tennessee. High pressure rapidly succeeding it, a "norther" was produced along the Gulf coast, reaching Key West on the 6th. By morning of the 6th it was central over or north of the mouth of the St Lawrence, with still lower central pressure, 29.07 at Farther Point. During the day it moved to Newfoundland, followed by northwesterly gales and cold, clearing weather, except frequent snows from the Lakes to northern New England. Cautionary Signals were ordered to be displayed in its advance on the 2nd at Indianola and Galveston; 3rd, at Mobile, New Orleans and Upper Lake stations; 4th, Lower Lake stations; 5th, along the entire Atlantic coast from Eastport to Key West, and at St. Marks. They were justified at all stations except St. Marks, Baltimore, Detroit, Port Huron, Alpena and Chicago. The following maximum wind velocities in miles per hour, with direction, show the dangerous character of the storm—Indianola, N. 46; Galveston, NW. 43; Key West, N. 30; Charleston, S. 34; Smithville, S. 50; Cape Lookout, S. 60; Cape Hatteras and Kittyhawk, S. 44; Sandy Hook, S. 36 and W. 48; Wood's Holl, SW. 55; Thatcher's Island, S. 40 and W. 36; Eastport, S. 39; Mt. Washington, NW. 96; Buffalo; W. 48; Cleveland, W. 35; Milwaukee, SW. 36; Duluth, NE. 40; Bismarck, NW. 48; Breckenridge, N. 36; Yankton, NW. 35; St Louis, W. 36; Omaha and Denison, NW. 36 miles. Along the New England coast, and at Grand Haven and Galveston, steamers were forced to seek shelter. Warnings were also sent on the 4th for the Canadian stations on Georgian Bay, Lake Huron and Lake Erie; 5th, for those on Lake Erie, in the St. Lawrence valley, and along the coasts of New Brunswick and Nova Scotia; 6th, for Newfoundland.

No. III.—Although the centre of this disturbance moved eastward at some distance to the north of the Signal Service stations, yet it can be traced to the Pacific coast. During the 5th falling barometer, southerly winds and rainy weather prevailed in Washington Territory and Oregon, with the centre of the storm to the northward. On the 6th it approached Manitoba. The 7th light snows occasionally fell from northeastern Dakota to the Lakes, with fresh and brisk southerly winds veering to westerly and northwest. During the 8th and 9th it disappeared over the Gulf of St. Lawrence, accompanied by light snows from the Lake region eastward. Not any signals were displayed during its progress. The following high winds occurred on the 7th: Bismarck, NW. 36 miles: Milwaukee, SW. 27; Grand Haven, NW. 36; Sandusky, W. 28; Buffalo, SW., 32. 8th, Sandy Hook, W. 28; Thatcher's Island, W. 32.

No. IV.—Like the preceding this was first felt in Washington Territory and Oregon on the 8th, where rainy weather prevailed, with the pressure slightly below the normal. In the Northwest the barometer fell quite rapidly, and was lowest on the afternoon of the 9th in northeastern Dakota, with high southerly winds in the Upper Mississippi valley. Its progress was then eastward, and northeastward into Canada on the 10th. A barometric trough formed toward the New England coast. Frequent light snows fell in the Lake region and New England, with fresh to brisk southerly winds veering to westerly, except northeasterly in Maine, but it lost its identity as the following storm approached. Cautionary Signals were ordered on the 10th at Cape May, Sandy Hook, and along the New England coast, but not justified, except at Eastport, N. 28; Thatcher's Island, NW. 36.

No. V.—After the preceding had passed eastward, the pressure again began to diminish in Washington Territory and Oregon, with continued rain, on the 9th. Afternoon of the 10th it was central in Manicoba, with rain. By referring to the chart it will be seen that its movement was very rapid and southeastward to the coast of Maine during the 10th and 11th, thence northeastward. From southern New England to Lake Ontario light rains and fresh to brisk southerly, veering to westerly, winds accompanied it, but thence north and eastward snow and brisk to high easterly winds, backing to northerly and westerly. Cautionary signals were continued on the 11th along the New England coast, and warning sent for the Canadian stations midnight of the 10th.

No. VI.—During the night of the 9th the pressure nearly recovered the normal in Oregon after the last storm had progressed to the eastward, but with continued rain. On the following day it again diminished, falling 0.38 below the normal at Portland during the afternoon, with heavy rains. The 11th frequent light rains fell from Washington Territory, to northern California, and the pressure regained the normal. Falling barometer and warm southeasterly winds indicated its approach toward Dakota and Manitoba. At 7:35 a. m. of the 12th it was central in Manitoba. As it passed southeastward a barometric trough reached to Texas. Rainy weather prevailed in the southern half of Texas, with easterly to southerly winds. During the 13th the centre of the storm passed over Maine, with the central pressure diminishing, and the barometer falling 0.65 below the normal at Eastport. From the Ottawa and St. Lawrence valleys to New Brunswick easterly gales, backing to northerly and northwest, with heavy snow prevailed; but in Nova Scotia, the larger portion of New England, New York and the Lower Lakes, brisk and high southerly winds, veering to westerly and northwest, with generally light rains. In southern Texas rainy weather continued, with occasional thunderstorms. Morning of the 14th the barometer at Sydney, Cape Breton, read 29 09, and northwesterly gales, with cold, clear or clearing weather were reported from thence to N. Carolina. During the day it disappeared to the eastward. Cautionary signals were ordered to be displayed on the night of the 12th at the Lower Lake stations, and those along the New Jersey and New England coast; afternoon of the 13th along the North Carolina coast. Warnings were also sent night of the 12th for the Canadian stations on Lakes Erie and Ontario, and in the St. Lawrence valley, and the 13th for those in Nova Scotia and New Brunswick. All were fully justified. Maximum velocities—Alpena, NW. 30; Erie, NW. 38; Buffalo, SW. 36; Toronto, NW. 31; Oswego, NW. 32; Father Point, NE. 40; Eastport, NW. 50; Thatcher's Island, NW. 52; Boston, NW. 48; New York, NW. 43; Sandy Hook and Cape May, NW. 48; Kittyhawk, N. 54; Cape Hatteras, NE. 34; and Mt. Washington, NW. 120 miles.

No. VII.—After high pressure area No. III had passed eastward from the Rocky Mountain region, the barometer fell below the normal along the Pacific coast on the 12th and 13th, and in northern Dakota and Manitoba, with brisk southerly to westerly winds, night of the 13th. Rainy weather was reported from Washington Territory the 14th; the barometer at Pembina 0.49 below the normal in the afternoon, with the centre of the disturbance probably in Manitoba; and high southerly winds in western Kansas and Nebraska. During the 15th it moved to the St. Lawrence valley quite rapidly; lowest barometer 29.36 at Quebec, with southerly winds veering to westerly and increasing to brisk and occasionally to high along the Middle Atlantic and New England coasts; light rains were occasionally reported from the Ohio valley and New Jersey to the Lower Lakes, New England and St. Lawrence valley, partly turning into snow in last district. The 16th it disappeared eastward over the Gulf of St. Lawrence. Signals were displayed night of the 15th along the New Jersey and New England coasts, only a portion of which were justified. Maximum velocities—Cape May, SW. 28 (late;) Sandy Hook, SW. 32 (late;) Eastport, NW. 30; and Mt. Washington, NW. 108 miles.

No. VIII.—At midnight of the 16h a disturbance apparently central north of Lake Superior. During the 17th it rapidly passed over the St. Lawrence valley, Maine and Nova Scotia, accompanied by occasional light snow or rain; lowest barometer, 29.69 at Sydney; high pressure area No. IV rapidly followed it. She barometric gradient between the two became quite steep, resulting in frequent high northerly winds from the St. Lawrence valley to Nova Scotia and New England, which extended during the night southward along the coast to North Carolina, but with generally clear weather, except rain on the North Carolina coast. Signals were ordered to be displayed, night of the 17th, along the New England and New Jersey coasts, and the 18th, as far south as Charleston. The majority were justified — Eastport, N. 32; Thatchers' Island, NE., 36 (late;) Sandy Hook, NE., 33; Atlantic City, NE. 32; Cape Hatteras, NE. 28; Cape Henry, NE., 34 (late;) and Cape Lookout, NE. 30 miles.

No. IX.—This storm can be traced to the Pacific coast In California the barometer fell to about 0.30 below the normal the 14th, with rainy weather and increasing easterly winds in the southern portion, at Los Angeles, NE., high. The 15th, the rain area extended eastward to southern Nevada and New Mexico, and frequent light rains fell in central and southern Texas, with a high SW., wind on Pike's Peak. On the 16th occasional light rains were reported from Nevada, Utah, Wyoming, New Mexico, and from Texas to Kansas, Missouri, Illinois and the Ohio valley, with thunder storms in Kansas. At midnight a barometric trough extended from northwestern Texas to Lake Superior. It is quite probable that low pressure No. VIII was formed or separated from this by high pressure No. IV. At 7 35 a. m. of the 17th it was central in Kansas and Nebraska; during the day generally light rains fell from Texas to the Ohio. Upper Mississippi and Lower Missouri valleys, with thunder storms in Kansas, Nebraska, Iowa, Illinois, Missouri and Indian Ty.; its northward progress was due to the pressure being high and decidedly above the normal to the eastward, and below the normal thence westward to the Pacific coast. The 18th it passed northward into Canada; frequent rains were reported from Texas, Indian Ty., and from the Lower Missouri valley to the Lakes, with thunder storms in Kansas, Indian Ty., and at Key West. The Signals displayed at Milwaukee and Grand Haven were not justified. Although the track cannot be charted after the morning of the 18th, yet from a study of the tri-daily maps of this office there is little doubt but that this disturbance is the same as the following.

No. X.—On the 19th rainy weather extended from the Lakes to New England and the eastern British Provinces, partly turning into snow in the St. Lawrence valley; high winds were reported from Wood's Holl, W. 28, and from Father Point, S. 30. During the 20th high pressure No. V rapidly succeeded it, producing a steep gradient, and, in consequence, high winds at places. Signals were displayed night of the 20th along the North Carolina and New Jersey coasts. Maximum velocities—Cape Lookout, NE. 36; Kittyhawk, NE. 30; Barnegat, NE. 29 (late); Boston, NW. 36; Eastport, N. 29; Father Point, N. 36, and Halifax, N. 28.

No. XI.—During the 15th, after storm No. IX had left the Pacific coast on its eastward march, the pressure began diminishing in Oregon. The 16th rainy weather was reported from northern California to Washington Territory, with the barometer 0.43 below the normal at Portland. The 17th frequent rains continued in the Pacific States, with the central disturbance advancing toward southern California; at San Diego high SE. wind. During the 18th clearing weather prevailed in the Pacific States; threatening and rainy weather in Arizona; frequent light rains and increasing southerly to easterly winds in Texas; SE. 28 at Camp Stockton. The 19th the centre passed into Texas, with a barometric trough extending to Iowa; it was followed by clearing weather in Arizona and New Mexico, and accompanied by rain and occasional thunderstorms from Texas to Iowa and Nebraska. The 20th rainy weather prevailed from Texas and Louisiana to Nebraska, with high winds and gales at places, severe thunder-storms in Texas, and with lower pressure—0.38 below the normal at Galveston. During this same day a second disturbance passed eastward over Washington Territory and Oregon, producing light rains; 21st, it crossed Montana, with snow or rain thence to northern California, Oregon and Washington Territory. The pressure being below the normal at the Rocky Mountain stations and decidedly above in the Atlantic States, this storm took a northward course on the 21st, with threatening or rainy weather from the Gulf and South Atlantic States to Nebraska, but gradually clearing away in the Southwest—pressure 0.43 below the normal at Fort Gibson. During the 22nd the two apparently combined in the Missouri valley, with continued threatening and rainy weather and frequent high winds, mostly easterly or southerly, from the East Gulf and South Atlantic States to the Northwest and Lake region, except high northerly winds and occasional snow in the western portions of Nebraska and Kansas—lowest barometer, 29.60, at Omaha. The 23rd it apparently disappeared northward over Manitoba, with frequent rains from Minnesota to the Lakes. Cautionary Signals were displayed on the 19th at Indianola, Galveston and Key West; 20th, at New Orleans, Mobile and St. Marks; 21st, along the South Atlantic coast; 22nd, at Milwaukee and Grand Haven. For Key West, St. Marks, Milwaukee and Grand Haven they were not justified. Maximum velocities: Indianola, E. 28 (late) and N. 40 miles; New Orleans, SE. 33 (late;) Mobile, SE. 28; Tybee Island, NE. 36; Cape Lookout, NE. 36; Duluth, NE. 32; St. Paul, E. 35; St. Louis and Cairo, SE. 25; Dodge City, NW., 33; North Platte, S. and NW. 28.

No. XII and XIII.—During the 22nd the winds shifted to easterly in southern Texas, with threatening weather and light rains, and a thunder storm at Indianola. By 7:35 a. m. of the 23rd the storm was central off the Texas coast, with brisk to high northerly winds. During the day threatening and rainy weather prevailed thence to the Ohio valley, Virginia and South Atlantic States; occasional thunder-storms in Texas, Louisiana and Alabama; and clearing away in Texas at night. The 24th rainy weather was reported from the East Gulf and South Atlantic States and Maryland to eastern Indian Territory, Missouri and the Upper Lake region, with thunder-storms from Florida and Alabama to southern Illinois. While at midnight it was central in southeastern Missouri, and barometer 29.87 at Cairo, a barometric trough was traced to the southeastward toward Florida, with a tendency to form a secondary depression in that direction, and which latter, No. XIII, was completed and central off the South Carolina coast by the following midnight, as shown on the chart; barometer at Charleston 0.39 below normal. During the 25th threatening and rainy weather continued from the Upper Mississippi valley and Lake region to the South Atlantic States and Maryland, and clear or clearing weather in the Gulf States. The 26th No. XII gradually lost its identity, while No. XIII increased very much in severity but not in extent. By midnight the barometer at Kittyhawk fell to 29.47, and at Cape Hatteras 0.62 below the normal. Along the North Carolina and Virginia coasts, severe northeast backing to northwest gales and very heavy rains prevailed. Frequent rains also fell on the 26th from the South Atlantic States to Missouri and the Lake region. The 27th this storm disappeared northeastward into the Atlantic, followed by clearing weather. Signals were ordered on the 26th along the North Carolina, Virginia and New Jersey coasts, all of which were justified, except in northern New Jersey; maximum velocities: Cape Lookout, (late) E. 30; Cape Hatteras, NE. 58; Kittyhawk, NE. 60; Cape Henry, NE. 56, and Cape May, NE. 26.

No. XIV.—During the 24th and and 25th the pressure diminished quite rapidly in Nova Scotia, with northerly winds and light snow. At midnight of the 25th the barometer at Sydney read 29.52, with easterly winds, and the centre of the storm to the south of that station. The 26th it disappeared to the northeastward. During the night of the 25th signals were ordered for Eastport, but not justified, and warnings sent for Halifax and Sydney, but too late to be of service.

No. XV.—This storm has been traced from the Pacific coast. On the 22d southeasterly winds, rainy weather and rapidly falling barometer were reported from Washington Territory and Oregon—0.33 below the normal at Portland by midnight. The 23rd, barometer 0.43 below the normal at San Francisco, and 0.32 at Salt Lake City; threatening weather and frequent rains prevailed from California to Washington Ty., with high southerly winds at San Diego, Mare Island and Red Bluff, Cal., and Pioche, Nevada. During the 24th clearing weather was reported from the Pacific States, and rain areas from Arizona, partly turning into snow thence to southern Nevada. The 25th a barometric trough was traced from Montana southward over Arizona, being probably lowest south of latter, with snow or rain from Nevada, Utah, Wyoming and Dakota to Arizona and New Mexico, high southeast winds at Santa Fe, and S. 40 miles on Pike's Peak. The 26th the trough moved eastward, with occasional light rains in western Texas, and light snows from Utah and Colorado to Dakota and Nebraska, and northeast gale on Pike's Peak. The 27th the storm-centre advanced into southern Texas, accompanied by thunder-storms, with increasing southeast to northeast winds and rainy weather in Texas, Indian Ty. and Kansas, and with northerly winds and snow from Colorado and Wyoming to Minnesota, partly changing into rain towards the Upper Lake region. During the 28th it advanced to the coast of Alabama with increasing severity and diminishing central pressure; at Mobile barometer 29.43 and 0.77 below the normal; the rain-area extended to the East Gulf States and Tennessee, with thunder-storms in Florida at night and clearing weather in southern Texas, with high northerly winds. The 29th it developed into two distinct depressions, central in eastern and western North Carolina; the central pressure continued diminishing—29.34 at Wilmington, and 0.83 below the normal. The storm increased in extent and severity; the rain-area advanced to the South Atlantic States, Virginias, Ohio and Upper Mississippi valleys, with easterly to northerly winds and turning into snow from northern Texas to Dakota and western Minnesota, with frequent high northerly winds. A severe "norther" prevailed on the Texas coast, and extended eastward to Florida as high northwesterly winds. At 7:35 a. m. of the 30th the storm was central to the southwest of Norfolk, where the barometer fell to 29.16, and 1.01 below the normal. During this day the rainy weather extended north and eastward, generally changing to very light snows along the New England coast, and in the Lower Lake region, clearing but cloudy weather, with brisk to high northwesterly winds, succeeded it in the Southern States and Ohio valley. The 31st, heavy snow fell in Nova Scotia, with northerly gales, and at midnight the barometer fell to 28.99 at Sydney; high northwest and northerly gales, with very generally clear weather, prevailed from North Carolina to Maine, and with occasional light rains in southern Florida. In North Carolina and Virginia the rains were very heavy, producing destructive floods. Along the East Gulf and Atlantic coasts, especially from the Carolinas to Nova Scotia, this storm was unusually severe, resulting in much damage to shipping. Quite a number of cases have been reported where coastwise steamers were obliged to seek shelter or delay sailing. Cautionary Signals were ordered to be displayed the 27th at Indianola (late) and Galveston; 28th, from New Orleans to Key West, and thence to Norfolk; 29th, as far north as Wood's Holl; 30th, thence to Eastport. Warnings were also sent for the Canadian stations, St. Johns, Halifax, Sydney and those along Lakes Erie and Ontario, on the 29th. The following maximum velocities are given, from which it will be seen that this storm was the most severe of the month: Indianola, E. 28 and N. 43, Mobile, E. 33, Key West, S. 33 and W. 40, Cape Lookout, E. 65 and W. 48, Cape Hatteras, NE. 52, Cape Henry, NE. 74, Cape May, NE. and NW. 48, Barnegat, NE. 70, Thatcher's Island, NE. 48, Eastport, N. 36, Vicksburg, W. 36, Montgomery, W. 28, Knoxville, NE. 30, Washington, NE. 27 and Philadelphia, NE. 38 miles.

INTERNATIONAL METEOROLOGY.

Storms at Sea—September 2nd and 3rd, 200 miles west of Cape Horn, NW. hurricane, lasting 8 hours, then shifting to SE., and lasting 36 hours; 11th, off Cape Horn, fearful gale from WSW.; 28th, lat. 17° 15′ N., long. 85° 25′ W., N. hurricane and very high sea from E. October 13th, off Cape of Good Hope, W. gale, lasting 30 hours; lat. 49° 40′ N., long. 15° 30′ W., terrific SW. to NW. gale; 14th, 39° 30′ N., 53° 20′ W., SE. to NW. hurricane, lasting 12 hours; 49° 39′ N., 11° 7′ W., S. to NW. hurricane, lasting 12 hours, barometer 28.70; 16th, 43° 36′ N., 45° 8′ W., W. hurricane, barometer 29.45; 44° 30′ N., 54° W., NNW. and W. hurricane, lasting 3 days; 17th, 39° 14′ N., 56° 8′ W., ESE. hurricane, lasting 4 hours; 42° N., 52° W., gale; 45° 30′ N., 38° 22′ W., WSW. hurricane, barometer 29.47; 40° N., 54° W., NW. hurricane; 41° 50′ N., 49° W., SW. hurricane, continuing during the 18th and 19th, barometer at 4 p. m., 18th, 28.4; 18th, 48° 30′ N., 42° 40′ W., S. to NW. hurricane, lasting 19 hours; 19th, St. Lawrence Bay, Arctic Ocean, heavy gale; 47° N., 29° W., very heavy N. by E. gale; 21st, 45° N., 179° 30′ W., W. gale, barometer 29.15; 29th, 47° 40′ N., 36° W., very severe SW. gales. Nov. 10th., coast of Honduras, hurricane; 11th, 55° N., 15° W., hurricane; 12th, 41° 48′ N., 53° W., strong NNE. gale, very heavy sea; 15th, 50° 40′ N., 13° 20′ W., heavy SW. to WNW. gale, very heavy squalls and high seas; 16th, Orkney Islands, S. to W., hurricane; 17th, North Uist, Scotland, NW. gale; 18th, 50° N., 18° W., strong gale; 35° 37′ N., 60° 40′ W., very heavy sea, sweeping decks; 19th, Crooked Island Passage, Bahama Islands, heavy N. gale; about 40° N. 50° W., strong hurricane; 21st, 48° 46′ N., 36° 17′ W. heavy NW. to NNE. gale and sea, lasting 24 hours; 25th, 36° N., 74° 50′ W., fearful wind, with heavy squalls; 8° N., 44° W., very heavy thunder-storm from E. Dec. 2nd, 30° N., 77° W., and 48° 30′ N., 39°54′ W., NW. gales; 48° 11′ N., 45° 12′ W., SW. strong gales; 3rd, 19°03 N., 105° 18′ W., heavy squalls, rain, thunder and lightning; 35° 5′ N., 58° 15′ W., strong NE. gale; 4th, 24° 30′ N., 80° 26′ W., heavy SE. gale; 5th, 33° N., 73° 30′ W., heavy S. gale, lasting 24 hours, followed by violent NW. gales; 28° 42′ N., 72° 56′ W., heavy SSE. gale, lasting until the 7th, barometer 29.80; 6th, 48° 08′ N., 36° 44′ W., and 51° 20′ N., 13° 07′ W., NW., gales; 32° 35′ N., 76° 42′ W., and 37° N., 69′ W., heavy SE., and SSE., gales; 7th, 43° 03′ N., 60° 02′ W., and 46° 45′ N., 43° 16′ W., strong westerly gales; 47° 17′ N., 42° 18′ W., SW., storm; 51° 07′ N., 19° 42′ W., strong NW., gale; 8th, 49° 37′ N., 47° 42′ W., heavy west gale; 46° 42′ N., 46° 28′ W., and 50° 51′ N., 26° 36′ W., strong NW., gales; 9th, 48° 08′ N., 33° 51′ W., very heavy NW., squalls and tremendous sea; 10th, 51° 18′ N., 18° 34′ W., strong WSW. gale; 48° 10′ N., 39° 12′ W., heavy NW. to SW. hurricane-like gale; 49° 24′ N., 15° 42′ W., NW. storm. 11th, 50° 48′ N., 20° 10′ W. and 49° 23′ N., 22° 39′ W., strong W. and NW, gales; 47° 03′ N., 44° 58′ W., N. gale; 41° 30′ N., 65° 32′ W., NW. gale; 50° 44′ N. 19° 35′ W., strong SW. gale. 12th, 50° 12′ N., 24° 46′ W., strong NW. gale; 82° 50′ N., 71° W., heavy SW. gale, lasting 12 hours. 13th, 49° 33′ N. 28° 32′ W., strong NW. to S. gale. 14th, 48° 56′ N., 32° 35′ W., strong SW., to W., gale; 45° 59′ N., 58° 15′ W., SW., hurricane lasting 5 hours; 41° 46′ N., 62° 25′ W., strong NW. gale. 15th, 40° 32′ N., 68° W., N. gale. 18th, 49° 28′ N., 34° 45′ W., and 47° 40′ N., 44° 18′ W., heavy west gales. 22nd, 40° 46′ N., 63° 23′ W., NW. gale with hail and snow squalls.

Earthquake Shocks—were felt October 9th, in Peru; October 12th, Isthmus of Panama; November 18th, Bermuda Islands, at 5 a. m.

TEMPERATURE OF THE AIR.

The isothermal lines and figures upon chart No. II illustrate the general distribution of the temperature of the air for the present month. A reference to the table upon the same chart will show that the average is above that for many years in all the districts, and decidedly so from the Missouri valley to the Lakes, Ohio valley and Tennessee, being 20° above the average in Minnesota. Along the Pacific coast and at the Rocky Mountain stations it has been only slightly above the average. Under the heads of Ice, Navigation and Miscellaneous Phenomena will be seen the effect of these high averages.

Maximum and minimum temperatures, respectively, for the month are—in Maine, at Cornish, 1°, 48°; Surrey, 8°, 55°. New Hampshire, Mt. Washington, —13°, 39°; Auburn, 7°, 56°. Vermont, Woodstock, —2°, 51°; West Charlotte, 13°, 55°. Massachusetts, Boston, 4°, 59; Rowe, 10°, 46°. Rhode Island, Chepachet, 12°, 60°; Newport, 19°, 57°. Connecticut, Colebrook, 7°, 53°; New Haven, 15°, 60°. New York; Palermo, —4°, 49°; Rochester, 16°, 58°; New York City, 22°, 61°. New Jersey, Vineland, 19°, 61°; Atlantic City, 18°, 64°; Salem, 22°, 70°. Pennsylvania, Franklin, 14°, 54°; New Castle, 27°, 68°; Philadelphia, 22°, 63°. Delaware, Milford, 19°, 66°; Dover, 21°, 64°. Maryland, Woodstock, 15°, 63°; New Market, 20°, 68°. District of Columbia, Washington, 21°, 66°. Virginia, Snowville, 12°, 64°; Wytheville, 13°, 73°; Capeville, 29°, 65°. West Virginia, Helvetia, 13°, 64°. North Carolina, Franklin, 10°, 67°; Weldon, 21°, 77°; Wilmington, 25°; 73°. South Carolina, Spartanburg, 18°, 67°; Aiken, 20°, 70°. Georgia, Atlanta, 10°, 73°; Forsyth, 23°, 74°; Tybee Island, 31°, 72°. Florida, Fort Barrancas, 18°, 72°; Houston, 22°, 77°; Key West, 54°, 81°. Alabama, Green Spring, 15°, 70°; Mobile, 26°, 73°. Mississippi, Brookhaven, 20°, 72°; Vicksburg, 23°, 73°. Louisiana, Shreveport, 22°, 74°; Baton Rouge Barracks, 28°, 78°. Texas, Mason, 14°, 69°; Denison, 23°, 68°; Indianola, 33°, 77°. Indian Territory, Fort Gibson, 14°, 69°; Fort Sill, 20°, 72°. Arkansas, Mt. Ida, 10°, 68°. Tennessee, Austin, 14°, 70; Spring Garden, 16°, 72°. Kentucky, Danville, 12°, 63°; Louisville, 26°, 67°. Ohio, Westerville, 12°, 66°; Toledo, 24°, 59°; Jacksonburg, 27°, 72°. Indiana, St. Mary's Home, 12°, 72°; St. Meinrad, 17°, 74°. Michigan, Escanaba, 10°, 45°; Alpena, 12°, 50°; Grand Haven, 25°, 61°. Wisconsin, Neillsville, —4°, 55°; Beloit, 13°, 64°. Illinois, Elmira, 10°, 62°; Chicago, 23°, 66°; Martinsville, 26°, 75°. Missouri, Corning, 3°, 66°; St. Louis, 21°, 69°. Iowa, Vail, —11°, 60°; Keokuk, 21°, 65°. Minnesota, Breckenridge, —10°, 49°; St. Paul, 10°, 56°. Dakota, Fort Pembina, —4°, 49°; Bismarck, 2°, 56°; Yankton, —1°, 52°. Nebraska, Sydney Barracks, —17°, 69°; Emerson, 6°, 64°. Kansas, Fort Hays, 4°, 62°; Leavenworth, 13°, 67°; Stanley, 20°, 76°. New Mexico, Fort Union, —6°, 57°; Santa Fe, 2°, 52°. Colorado, Pike's Peak, —26°, 30°; Fort Lyon, —10°, 63°; Colorado Springs, —2°, 69°. Wyoming Territory, Fort Sanders, —38,° 60; Cheyenne, —10°, 64°. Montana, Idaho, Oregon, Washington Territory and Arizona reports missing. Utah, Salt Lake City, 8°, 51°. Nevada, Winnemucca, —1°, 57°. California, Fresno, 28°, 69°; Visalia, 31°, 68°; Red Bluff, 32°, 66°; Alcatraz Island, 40°, 69°; Salinas City, 33°, 69°.

Ranges in Temperature.—The *monthly* ranges will appear from an inspection of the minimum and maximum temperatures just given. The smallest ranges are found at the stations along the immediate coasts and lakes; the largest, in the interior, especially from Colorado and Wyoming to western Minnesota. *Daily.*—In New England, they vary from 19°, least, at Wood's Holl to 31°, greatest, on Mt. Washington. Middle Atlantic States, from 19° at Sandy Hook to 32° at Lynchburg. South Atlantic States, from 22° at Charleston to 37° at Augusta. East Gulf States, from 27° at Mobile to 33° at St. Marks. West Gulf States, from 17° at Galveston to 38° at Jacksboro, Texas. Ohio valley and Tennessee, from 24° at Memphis and Louisville to 32° at Nashville. Lower Lake region, from 21° at Buffalo to 26° at Cleveland. Upper Lake region, from 17° at Escanaba to 25° at Duluth. Upper Mississippi valley, from 21° at St. Louis to 27° at Dubuque. Breckenridge, 31°. Lower Missouri valley, from 25° at Leavenworth to 35° at Yankton. Indian Territory and plains of Kansas and Nebraska, from 31° at Fort Sill to 44° at North Platte. Rocky Mountain stations, from 31° at Santa Fe to 41° at Denver. California, from 13° at San Francisco to 33° at Visalia.

Frost in Ground.—The following reports show the conditions generally: New England—Cambridge and Westboro, Mass., ground generally free from frost. Lake region—Embarass, Wis., frost out of ground at end of month; Rocky Run, Wis., plowing through month. Middle Atlantic States—Sandy Springs, Md., plowing every day, excepting 1st; Cazenovia, N. Y., farmers plowing through the month; Palermo, N. Y., farmers plowing 28th; Wappinger's Falls and Farmingdale, N. Y., farmers plowing and harrowing; Hector, N. Y., farmers plowing through month; Carlisle, Pa., farmers plowing through month. The Northwest—Vail, Iowa, plowing 18th to 31st; Monticello, Iowa, plowing 30th; Booneboro, Iowa, plowing throughout month; Minneapolis, plowing 21st to 29th; Clear Creek, Neb., plowing 18th to 30th; Pembina, plowing during month.

Ice.—1st, ice reported as having formed at Vicksburg, Galveston, Mobile, Tybee Island and Quitman, Ga., and New London; river frozen over at Toledo; sufficiently strong to bear teams at Bismarck. 2nd, formed at Quitman, Ga.; Mobile, ½ in.; Houston, Fla., ¼ in.; Point Pleasant, La., till 3rd; Mesilla, Tex.; Baxter Springs, Kan., 2½ in.; Independence, Kan., till 9th; Standish, Me. 3rd, formed at Galveston; Rochester, canal frozen over; Wappinger's Falls, N. Y., 1¼ in.; Flushing, N. Y., 2 in. 6th, Austin, Tex., formed till 8th; Point Pleasant, La., till 11th. 8th, Wappinger's Falls, N. Y., lake open. 9th, formed at Wilmington, N. C. 10th, formed at West Waterville, Me.; at Brookhaven, Miss., ½ in. 20th, Auburn, N. H., lake closed. 23rd, formed at Sandy Hook. 24th, Cazenovia, N. Y., lake frozen over. 25th, at Pembina, ice in river honey-combed by thaw. 26th, formed at Sandy Hook; Visalia, Cal., ¼th in. 27th, Standish, Me. 29th, Salem, N. J.; Wappinger's Falls, lake frozen over. 30th, Independence, Kan.; near Melissa, and at Austin, Tex. 31st, Wappinger's Falls, 2 to 3 inches thick; West Charlotte, Vt., no ice on lake; Embarrass, Wis., ice disappeared; Alpena Bay and river, free from ice.

PRECIPITATION.

In General.—The general distribution of rain and melted snow for the month is shown on chart No. III. The table in the lower left-hand corner gives the average precipitation in the various districts, for December, for several years, and for the present month. From the Missouri valley to the Upper Lakes and in the South Atlantic and East Gulf States the rainfall has been greater than the average for December; in the remaining districts it has been less.

Special Heavy Rains.—3rd, Clarksville, Tex., 2.75 inches; Galveston, 2.19 in.; Fort Barrancas, Fla., (3rd and 4th,) 5.36 in. 4th, Quitman, Ga., (4th and 5th,) 4.70 in.; Point Pleasant, La., 1.80 in.; St. Mark's, (4th and 5th,) 4.29 in. 5th, Jacksonville, Fla., 1.28 in.; St. Mary's, Ga., (5th and 6th,) 2.00 in.; Cape Lookout, N. C., 1.62 in.; Helvetia, W. Va., 1.25 in.; Cape Hatteras, (5th and 6th,) 3.58 in. 6th, Mt. Washington, N. H., (5th and 6th,) 3.87 in. 7th, Lawrence, Mass., 1.70 in. 9th and 10th, Eagle Pass, Tex., 2.43 in. 12th and 13th, San Antonio, Tex., 1.72 in. 17th and 18th, Fort Sill, Ind. Ter., 3.79 in.; Los Angeles, Cal., 2.21 in. 19th Cape Hatteras, 4.17 in. 20th, San Antonio, Tex., (19th and 20th,) 2.58 in.; New Ulm

Tex., 2.63 in.; Mason, Tex., (19th and 20th,) 3.34 in.; Fort McKavett, Tex., 2.03 in.; Fort Griffin, Tex., (19th and 20th,) 3.90 in.; Fredericksburg, Tex., 3.40 in.; Uvalde, 2.12 in. 21st, Belmont Farm, (Melissa) Tex., (20th and 21st, 3.00 in.; Baton Rouge Bks, La., 1.90 in. 22nd, Dodge City, (19th to 22nd,) 4.30 in.; Olivet, Dak., 1.02 in. 23rd, Quitman, Ga., 1.30 in.; Shreveport, 1.25 in.; Red Bluff, Cal., 2.58 in. 24th, Mt. Ida, Ark., (23rd and 24th,) 2.80 in.; San Diego, (23rd to 25th,) 1.41 in. 26th, Cape Hatteras, 3.72 in.; Kittyhawk, N. C., 4.40 in. 27th, Mason, Tex., 2.12 in.; Uvalde, Tex., (27th and 28th,) 2.10 in. 28th, San Antonio, Tex., (27th and 28th,) 2.18 in.; Belmont Farm, (Melissa) Tex., (27th and 28th,) 5.00 in. 29th, Wilmington, N. C., 2.98 in.; Smithville, N. C., 2.86 in.; Green Springs, Ala., (28th and 29th,) 2.48 in.; Point Pleasant, La., (28th and 29th,) 2.30 in.; Brookhaven, Miss., (28th and 29th,) 1.80 in; Cape Lookout, N. C., 3.24 in. 30th, Weldon, N. C., 1.25 in.; Goldsboro, N. C., (29th and 30th,) 3.00 in.; Wilmington, N. C., (29th and 30th,) 2.34 in.; Lenoir, N. C., (29th and 30th,) 2.70 in.; Statesville, N. C., (29th and 30th,) 2.20 in.; Cape Henry, Va., 2.73 in. 31st, Accotink, Va., (30th and 31st,) 1.50 in.

Large Monthly Rain-falls.—At Cape Hatteras, N. C., 13.38 in.; Olympia, Wash. Ty., 11.70 in.; Belmont Farm, (near Melissa,) Texas, 9.10 in. (?); Lenoir, N. C., 8.70 in. (?); Kittyhawk, N. C., 8.45 in.; Coleman City, Texas, 8.42 in.; Cape Lookout, N. C., 8.14 in.; Fort Barrancas, (near Pensacola,) Fla., 8.02 in.; St. Marks, Fla., 7.79 in.; San Antonio, Texas, 7.27 in.; Fort Sill, Ind. Ty., 6.97 in.; Mt. Washington, 6.01 in.

Small Monthly Rain-falls.—At Fort Boise, Idaho Ty., 0.01 in.; Carlisle Pa., 0.05 in.; North Argyle, N. Y., 0.07 in.; Colorado Springs, Col., 0.08 in., Sydney Barracks, Neb., 0.10 South Pueblo, Col., 0.11 in. At Winnumucca, Nev., there was not any precipitation during the month, except a very slight fall on the 1st, which was not sufficient to obtain a measurement.

Floods.—Special heavy floods followed the rains of the 29th, 30th and 31st, accompanying storm No. XV on chart No. I. during its course northeastward from Alabama to southern Virginia. The tide rose higher at Norfolk than since last April, the lower portion of the city becoming flooded, with much loss to property. On the coast of New Jersey heavy northeast gales prevailed during the 30th, producing high tides, washing away from two to four miles of railroad track at Atlantic City.

Hail fell on the 4th at Grand Haven, Mich.; 5th at Vevay, Ind., and McMinnville, Tenn.; 8th and 9th at Embarrass, Wis.; 13th at Gardiner, Me., and New Bedford, Mass.; 28th at Vevay, Ind.; 30th at West Chester, Pa.

Snow.—At Pembina, D. T., there was not sufficient snow on the ground at any time to permit the use of sleds or sleighs.

Depth of snow on ground at close of month.—In New England it varies from 0.25 inch to 16 in.; northern portions of New York and Pennsylvania, from .01 to 0.50 in.; West Virginia, 0.15 in.; Virginia, 12 in. at Wytheville; northern Illinois, 0.20 to 0.50 in.; eastern Kansas, 0.25 to 2 in.; northwestern Iowa, 2.50 in.; Nebraska, 1 to 3 in.; northern Minnesota, 0.25 to 0.50 in.; Dakota, 0.02 to 1.50 in.; New Mexico, at Santa Fe, 1.50 in.; Colorado, 4 to 12 in.; Wyoming, 3 in. at Cheyenne; Montana, Virginia City, some snow on mountains; Utah, Salt Lake City, 3 in.; Nevada, Pioche, 0.05 in.; California, San Gorgonio, 2 in. On the 31st, at Starkey, N. Y., the ground is reported as very dry, and a scarcity of water.

Rainy Days.—The number of days on which rain or snow has fallen varies as follows: New England, from 1 to 12; Middle Atlantic States, 1 to 19; South Atlantic States, 5 to 14; Lower Lake region, 1 to 22; Tennessee and Ohio valley, 5 to 19; East Gulf States, 5 to 14; West Gulf States, 2 to 16; Upper Lake region, 7 to 17; the Northwest, 5 to 16; Rocky Mountain region, 1 to 9; California, 2 to 8.

Cloudy Days.—The number reported by the voluntary observers is as follows: New England, 0 to 16; Middle States, 5 to 13; South Atlantic States, 6 to 14; East Gulf States, 4 to 15; West Gulf States, 4 to 14; Tennessee and Ohio valley, 9 to 16; Lower Lakes, 3 to 23; Upper Lake region, 5 to 17; the Northwest, 4 to 19; Rocky Mountain region, 1 to 9; California, 7 to 22.

Precipitation from Cloudless Skies.—At Santa Fe, on the 4th, as snow; Bangor, Me., 12th, snow; New Haven, Conn., 13th, rain.

RELATIVE HUMIDITY.

The average relative humidity for the month, ranges about as follows: For New England, 60 to 74; Middle Atlantic States, 59 to 78; South Atlantic States, 69 to 81; East Gulf States, 71 to 78; West Gulf States, 60 to 83; Tennessee and the Ohio valley, 68 to 74; Lower Lake region, 76 to 86; Upper Lake region, 72 to 83; Upper Mississippi valley, 70 to 79; Lower Missouri valley, 70 to 78; California coast, 56 to 73; Sacramento valley, 74 to 75. High stations report the following: Mt. Washington, 78; Pike's Peak, 56; Cheyenne, 48; Denver, 54; Santa Fe, 60; Salt Lake City, 68; Virginia City, 63; Boise City, Idaho, 68; Winnemucca, Nev., 59; Pioche, Nev., 57.

WINDS.

In General.—The prevailing winds, at the Signal Service stations, are shown by the arrows on chart No. II. The *maximum* hourly velocities have been given in the description of the movements of high and low pressure areas.

Total Movements of the Air.—The following are *the largest*, as recorded at the Signal Service stations, viz: Kittyhawk, 12,987 miles; Cape Lookout, N. C., 12,751; Cape May, 12,541; Pike's Peak, 12,491; Sandy Hook, 12,107; Cape Henry, 11,917; Thatcher's Island, 11,358; Cape Hatteras, 10,556; Sandusky, Ohio, 10,525; Key West, 10,454; Barnegat, 10,272; Indianola, 10,101; Dodge City, 9,217; Easport, 9,159; Breckenridge, 8,705; New York, 8,618; Grand Haven, 8,448; Cleveland, 8,462; Tybee Island, 8,163. *The smallest*, are: La Mesilla, N. M., 1,115 miles; Visalia, Cal., 1,164; Boise City, 1,370; Virginia City, 1,600; Augusta, 2,445; Lynchburg, 2,606; Nashville, 2,832; Springfield, 2,873; Salt Lake City, 2,978; Shreveport, 3,172; Sacramento, 3,187; Eagle Pass, 3,230; Knoxville, 3,248; Brackettville, 3,325; San Antonio, 3,501; Los Angeles, 3,705; Laredo, 3,969; Pioche, 4,048; San Francisco, 4,058; Mobile, 4,064.

VERIFICATIONS.

Indications.—As worked up three times daily, they have been carefully compared with the actual conditions during the succeeding twenty-four hours, and the following result obtained, viz: The percentage verified averages 85.9 for New England; 86.5 for the Middle Atlantic States; 87.7 for the South Atlantic States; 82.9 for the East Gulf States; 84.2 for the West Gulf States; 84.9 for the Ohio valley and Tennessee; 88.2 for the Lower Lake region; 83.5 for the Upper Lake region; 80.0 for the Upper Mississippi valley; 78.0 for the Lower Missouri valley. For all the districts the average verified is 84.2 per cent. By elements the percentage verified averages 87.1 for the weather; 82.8 for the wind direction; 85.7 for the temperature; 80.8 for barometric changes. There were 32 ommissions to predict (5 for weather, 9 for wind direction, 12 for temperature, and 6 for barometer) out of 3,720, or 0.9 per cent. Of the 3,688 predictions that have been made, 129, or 3.5 per cent., are recorded as having completely failed; 137, or 3.7 per cent., as one-fourth verified; 436, or 11.8 per cent., as one-half verified; 544, or 14.8 per cent., as three-fourths verified; 2,442, or 66.2 per cent., as completely verified.

Cautionary Signals.—The display of signals was discontinued at the Lake stations, excepting Milwaukee and Grand Haven, on the 16th inst., on account of the close of navigation. Out of 187 signals ordered, 155, or 82.9 per cent., were reported justified by subsequent hourly velocities of 25 miles and over, but of these six were late. There were 32 reported as not justified. From scattered stations there are 54 reports of the wind having obtained an hourly velocity of 25 miles and over without the display of signals; excepting on 2nd, brisk to high northerly winds from southern New Jersey to the North Carolina coast; on the 7th and 8th, southerly to westerly winds along Lake Erie.

Sunsets.—The characteristics of the sky, as indicative of fair or foul weather, for the succeeding 24 hours, have been observed at all Signal Service stations. Reports from 111 stations show 3,414 observations to have been taken. Of these 63 were reported doubtful; 2,823 cases, or 84.2 per cent., were followed by the anticipated weather, and 588 were not.

NAVIGATION.

Stages of water in rivers.—In the table on chart No. III are given the highest and lowest readings on the Signal Service river-gauges, from which it will be seen that at no time has the danger line been reached. The following reports of the effect of ice upon navigation have been received, viz: Missouri river—at Yankton, 1st to 24th, channel closed by ice; 24th, river opened; 31st shore ice. Upper Mississippi river—from Lake Pepin to St. Paul, 20th, ice broke up and disappeared; at St. Paul, 22nd, ice in river moved at 4 p. m. La Crosse, 1st, ice in river; 2nd, frozen over, and navigation closed; 20th, ice thawing rapidly; 21st, 11:30 a. m., ice broke up; 2 p. m., river open to navigation—ferries commenced running. Dubuque, 1st, navigation closed; 6th and 10th, floating ice in river; 15th, main channel free of ice; 20th, ice disappeared. Davenport, 1st to 11th, floating ice in river; 12th, river clear, and navigation opened. Burlington, 1st, floating ice in river. Keokuk, 1st, floating ice in river; 5th, river free of ice. St. Louis, 2nd, floating ice in river; 4th, noon, ice disappeared. Upper Lakes—Port Huron, 10th, navigation closed on Lake Huron. Sault Canal, 1st, closed. Duluth, 7th, navigation was virtually closed on Lake Superior, but on the 22nd the last boat is reported as arriving from Buffalo. Lower Lakes—Buffalo, 13th, navigation closed. Cleveland, 19th, navigation closed. North Volney, N. Y., navigation on Lake Ontario open throughout month. Red river of the North—Pembina, 1st, partially frozen over. Dakota, Morristown, 26th, river full of floating ice. Illinois—Rockford, 1st to 3rd, 7th and 8th, river frozen over; 6th and 11th, river clear. Ohio—Ringgold, 1st, Miama canal closed with ice; 4th, free from ice. New York—Albany and Rochester, 7th, canal navigation closed. Canastata, 29th, Erie canal free from ice. Rome, 2nd, canal frozen over. Hudson river, 14th, Albany and New York boats withdrawn for season. Maine—Bangor, 30th, Penobscot river frozen, navigation closed. Gardiner, 10th, Kennebec river closed. Massachusetts—Lowell, Merrimac and Concord rivers closed by ice.

Special River Report.—At Omaha the channel in the Misouri river is reported to be regaining its former position between piers 9 and 10, the river bed filling up between piers 7 and 9, counting from the Nebraska shore.

ATMOSPHERIC ELECTRICITY.

Thunder-storms occurred on the 3d, Ind. T., Tex., Kan.; 4th, Mich., Ill.; 5th, Ky., Fla., Tenn., Ind.; 8th, Fla.; 13th, Tex., Ill.; 16th, Kan.; 17th, Kan., Ind. T., Ill., Iowa, Neb., Mo.; 18th, Ind. T., Kan.; 19th, Tex., Kan., N. M.; 20th, Tex., "most severe thunder-storm ever known;" 21st, Tex.; 22nd, Ala.; 23rd, Tex., Ala., La.; 24th, Ala., Fla; 27th, Tex.; 28th, Ind. T., Tex., Fla., 29th, Ind. T., Fla., Tex.; 30th, Ind. T.

Distant Lightning—was reported as follows: 3rd, Ind. T., Tex.; 4th, Ill.; 17th, Kan.; 18th, N. M.; 22d, Tex.; 24th, Ala., Ga.; 26th, Tex., and electricity intense on Pike's Peak.

Auroras.—were observed on the 3rd, in Dak.; 4th, Ga., Dak.; 5th, Dak.; 7th, Iowa, N. Y.; 8th, Iowa; 9th, Conn., Iowa.; 12th, Dak.; 28th, Me.

OPTICAL PHENOMENA.

Solar Halos were observed on the 2nd, in Ill.; 3rd, Conn., Ill., Me., Ky., Vt., Wis.; 4th., La., Fla., N. J., Conn.; 5th, Cal., Vt., Neb.; 6th, Cal.; 7th, Ohio, Fla., Ga., Vt.; 8th, Tex., Iowa, S. C.; 9th, Ill., Iowa, La.; 10th, N. Y., Ill., Ind., Iowa, Ohio, Ky., Conn., Wis.; 11th, N. Y., Ohio, Conn., Wis.; 12th, Iowa, N. Y., Conn.; 13th, Cal., Ohio, Conn.; 15th, Col., Me., Neb., La.; 16th, Cal., Neb., Conn.; 17th, Cal., Conn.; 18th, Tex., Ky., N. H.; 19th, Col., Ohio; 20th, Cal., Ala., Me.; 22nd, Conn.; 23rd, Iowa, Ohio; 24th, Ohio, Conn.; 25th, Conn.; 28th, Cal., Ga.; 29th, Md., Mich., N. Y., Pa., Ohio, N. J.; 30th, Ill., Ind., Iowa, N. H.; 31st, Minn., S. C.

Lunar Halos.—8th, Tex., Cal., Iowa., Neb., Mo.; 9th, Ill., Ind., Pa., Tenn., Fla., N. J., Conn., Minn.; 10th, Dak., Neb., Ill., Ind., Iowa, Md., Ohio, Pa., Va., N. J., Fla., Mo., Cal., Idaho, Neb., Minn., Wis.; 11th, Neb., Ind., Iowa, Md., N. Y., Va., N. J., La., Mo., Ohio, Mich., Conn., Nev., Minn.; 12th, Md., Mass., Mich., N. Y., N. J., Mo., Wis., Ohio, Pa., R. I., Conn., Cal., Idaho, Nev.; 13th, Cal., N. Y., Va., Mo., Wis., N. C., Nev., Minn., Tex.; 14th, Cal., Neb., Dak., Iowa, Me., Md., Mass., Mich., N. Y., Vt., N. J., La., Mo., Minn., N. C., R. I., Conn., Cal., Minn., Wis.; 15th, Neb., Ill., Iowa, Mass., Minn., N. Y., Vt., La., Mich., Tenn., N. C., R. I., Idaho, Nev., Minn., Mo., Wis.; 16th, Neb., Ind., Ohio, Vt., Minn., Ohio, N. Y., Conn., Idaho, Nev., Wis.; 17th, Cal., Neb., Mich., Pa., Va., Ohio, N. Y., N. J., Me., Wis.; 18th, Col., Wy. Ty., Ala., Tex., Me., N. Y., Ohio, Vt., Va., Pa., Iowa, Me., Mass.; 19th, Col., Ind. T., Ala., Ohio, Va., N. J., La., Iowa, Conn., Idaho, Nev.; 20th, Col., Ala., Ga., Ill., Iowa, Neb., N. Y., Mo., Tenn., Ind., Fla., Conn., Me.; 21st, Ill., Ind., Iowa, Me., Neb., Ohio, N. J., Mass.; 22nd, Col., Ind., Kan., Va., Ohio, Conn.; 23rd, Iowa, Kan.; 24th, Ind., Iowa, Minn.; 25th, Ind., Kan.; 26th, N. Y.; 27th, N. Y.; 30th, Ga.

Mirage was observed on the 2nd in Dak. and Conn.; 3rd, Ga.; 6th, Minn., Neb.; 7th, Neb.; 8th, Kan., Neb.; 12th, Ga.; 15th, Neb., Ga.; 18th, Kan., Ga., Conn.; 20th, Conn.; 21st, Mass., Conn.; 23rd, Conn.; 24th, Kan., Conn.

MISCELLANEOUS PHENOMENA.

BOTANICAL.—*Connecticut*—New London, dandelions, daisies and dahlies, grass fresh and green, 23th; honeysuckle, pansies and quince in bloom 28th; Suffield, dandelions in bloom. *Dakota*—Pembina, willows and poplars budding during month. *Iowa*—Dubuque, 20th, lilies sprouting and grass growing; Nora Springs, pansies blooming 10th; dandelions in bloom 22nd; trees budding 23rd; Monticello, grass, rhubarb and corn growing during the month. *Indiana*—Logansport, 31st, rose bushes and maple trees budding; Vevay, 28th, japonicas blooming, roses and lilacs leafing; Milford, 18th, wild flowers in bloom. *Illinois*—Anna, strawberries in bloom, 15th; quince and lilac buds showing color, 31st; Martinsville, trees budding and leafing, 26th; shurbs and plants beginning to sprout 31st; Sterling, lilacs budding at the end of the month. *Kansas*—Creswell, 20th, winter wheat growing nicely and looking green as in spring. *Maryland*—Sandy Springs, flowers blooming throughout the month: Fallston, 28th, mountain pinks in bloom. *Massachusetts*—Fall River, flowers in bloom during the month; New Bedford, 6th, violets in bloom; Fitchburg, dandelions, apples, cherries, roses and lilacs blooming; Conway, sap running and sugar made. *Michigan*—Litchfield, dandelions and peach trees in bloom. *Missouri*, Troy, 7th, seeds of asters, hemp, mustard, &c., observed germinating in open ground; Lexington, rose, peach, lilac and other buds unfolding; Clinton, rose, peach and lilac budding, strawberries in bloom; Oregon, dandelions and crocus growing 22nd, rose bushes budding 23rd, wheat and rye growing rapidly 25th. *New Hampshire*, Contoocookville, 30th, blossom buds of the trailing arbutus swelling; Carrol County, trailing arbutus and lilacs in bloom. *Nebraska*—Emerson, 21st, horse-radish sprouting; Plattsmouth, 20th, fruit trees budding. *New Jersey*—Freehold, 23rd, magnolia, licac, spirea, elm, apple and maple trees budding, rose bushes leafing, and dandelions in bloom throughout the month; Salem, 30th, peach trees in leaf, pear trees blooming, and rose bushes in leaf and budding; Newark, 20th, elm and maple trees budding and leafing; Moorestown, 22nd, dandelions and japonicas in bloom. *North Carolina*—Murphy, pansies, English daisies, forsythia and wild flowers in bloom during last of month. *New York*—Waterburg, 31st, dandelions in bloom; Flushing, 29th, flowers in bloom; Farmingdale, 25th to 31st, dandelions in bloom and licac buds swollen as in spring. *Ohio*—Bellefontaine, 31st, grass growing and fruit trees budding; Urbana, 23rd, grass green and lilacs budding; 21st dandelions in bloom; Ruggles, wheat sprouting. *Oregon*—Salem, grass and pasturage in excellent

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condition. *Pennsylvania*—Green Castle, 16th, dandelions in bloom; Tioga, 25th, dandelions in bloom; Chambersburg, 28th to 31st, pansies, dandelions and honeysuckle in bloom; Hulmesville, 8th, dandelions in bloom. *Rhode Island*—Newport, roses, honeysuckle and pansies blooming and grass green. *South Carolina*—Aiken, 16th, jonquils in bloom. *Texas*—Clarksville, wheat and oats look well; cotton-picking nearly finished. *Tennessee*—Nashville, 28th, grass green and growing rapidly. *Virginia*—Alto Vista, 31st, strawberries in bloom; Prospect Hill, 28th, strawberries in bloom; Wytheville, 29th, lilac buds ready to burst, leaflets visible. *Wisconsin*—Embarrass, 31st, buds of the lilac and currant swollen as in spring; grass starting; fall grain looks as forward as that of last fall did the first of June.

Meteors were observed on the 1st, Mo., Ga.; 2nd, Conn., Ind., Iowa, Kan., Md., N. Y.; 3rd, Md., Mo., N. Y., Ohio., 6th, Ill.; 7th, Ind., La., Mass., N. J., Mo.; 8th, Conn., Iowa, Md., N. Y.; 9th, Ind., Iowa, Md.; 10th, Iowa, N. J., Pa.; 11th, Ind., Iowa, Kan., La., Md., Mass., N. Y., Pa., Mo., Neb.; 12th, Ind., Iowa, La., Md., Mo., Idaho.; 13th, Ind., Kan., Mo.; 15th, Mo.; 16th, Kan., Mass.; 17th, Cal.; 18th, Ga., W. Va.; 23rd, Mass.; 24th, Mass.; 25th, Kan., Me.; 26th, N. Y.; 27th, N. Y.; 28th, N. Y., Vt., Me.; 29th, Md., N. J.; 31st, Conn., Ill., Mass., N. J., Pa. Emerson, Neb., meteors nearly every night during the month. Clear Creek, Neb., 10th, several bright meteors during evening. Indianapolis, Ind., 12th, between 3 and 4 a. m., 51 meteors in 30 minutes. Tybee Island, Ga., 1st, large numbers of faint meteors appeared, 8 to 11 p. m., from east.

Prairie Fires, were reported as follows; on the 2nd, Ind. Ty.; 6th, Kan.; 7th, Kan.; 8th, Kan.; 9th, Dak., Ind. Ty., Kan.; 11th, Ind. Ty., Kan.; 12th, Dak. Kan.; 13th, Kan.; 14th, Dak., Kan.; 15th, Dak., Kan.; 16th, Dak.; 19th, Dak.; 28th, Kan.

Earthquake.—Canada—18th, Beachburg, Ont., between 5 and 6 a. m., two shocks; last one quite severe.

Zodiacal light was observed at Savannah, Ga., on the 1st, 2nd, 3rd and 5th; Southington, Conn., 2nd, 3rd, 7th, 8th, 23rd, 24th to 29th and 31st; St. Mary's Home, Ind., 2nd, 3rd, 7th, 8th, 9th, 11th to 14th; Great Bend, Kan., 7th, 11th; Somerset, Mass., 23rd to 29th and 31st; Rowe, 28th; Cambridge, Mass., Mass., 1st to 3rd, 7th, 23rd to 31st; Oregon, Mo., 15th; Atco, N. J., 31st; Monticello, Iowa, 31st.

SOLAR PHENOMENA.

Sun spots—The following observations, made by Mr. D. P. Todd, upon the spots of the sun, have been kindly communicated by Rear Admiral John Rodgers, U. S. N., Superintendent of the Naval Observatory:

Dec., 1877.	No. of new—		Disappeared by solar rotation.		Reappeared by solar rotation.		Total number visible.		Remarks.
	Groups	Spots.	Groups	Spots.	Groups	Spots.	Groups	Spots.	
1st, 12 m.	0	0	0	0	0	0	1	9	
2d, 3 p. m.	0	0	0	5	0	0	1	4	
3rd, 3 p. m.	0	0	0	2	0	0	1	2	
6th, 1 p. m.	0	0	0	2	0	0	0	0	
7th, 11 a. m.	0	0	0	0	0	0	0	0	
8th, noon	0	0	0	0	0	0	0	0	
9th, 3 p. m.	0	0	0	0	0	0	0	0	
13th, 2 p. m.	0	0	0	0	0	0	0	0	
14th, 11 a. m.	0	0	0	0	0	0	0	0	
15th, 1 p. m.	0	0	0	0	0	0	0	0	
16th, 3 p. m.	0	0	0	0	0	0	0	0	
17th, 11 a. m.	0	0	0	0	0	0	0	0	
18th, 11 a. m.	0	0	0	0	0	0	0	0	
20th, 2 p. m.	1	1	0	0	1	1	1	1	
31st, 11 a. m.	0	3	—	—	—	—	1	4	Two large groups of faculæ.

At the Cincinnati Observatory the following observations were taken by Mr. John Given, and communicated by Ormond Stone, Director of Observatory: December 20th, at noon—new groups, 1; new spots, 1. December 21st, at noon—visible, groups, 1; spots, 1.

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Albert J. Myer

Copy furnished for

Brig. Gen. (Bvt. Assgd.) Chief Signal Officer, U. S. A.

United State

United State

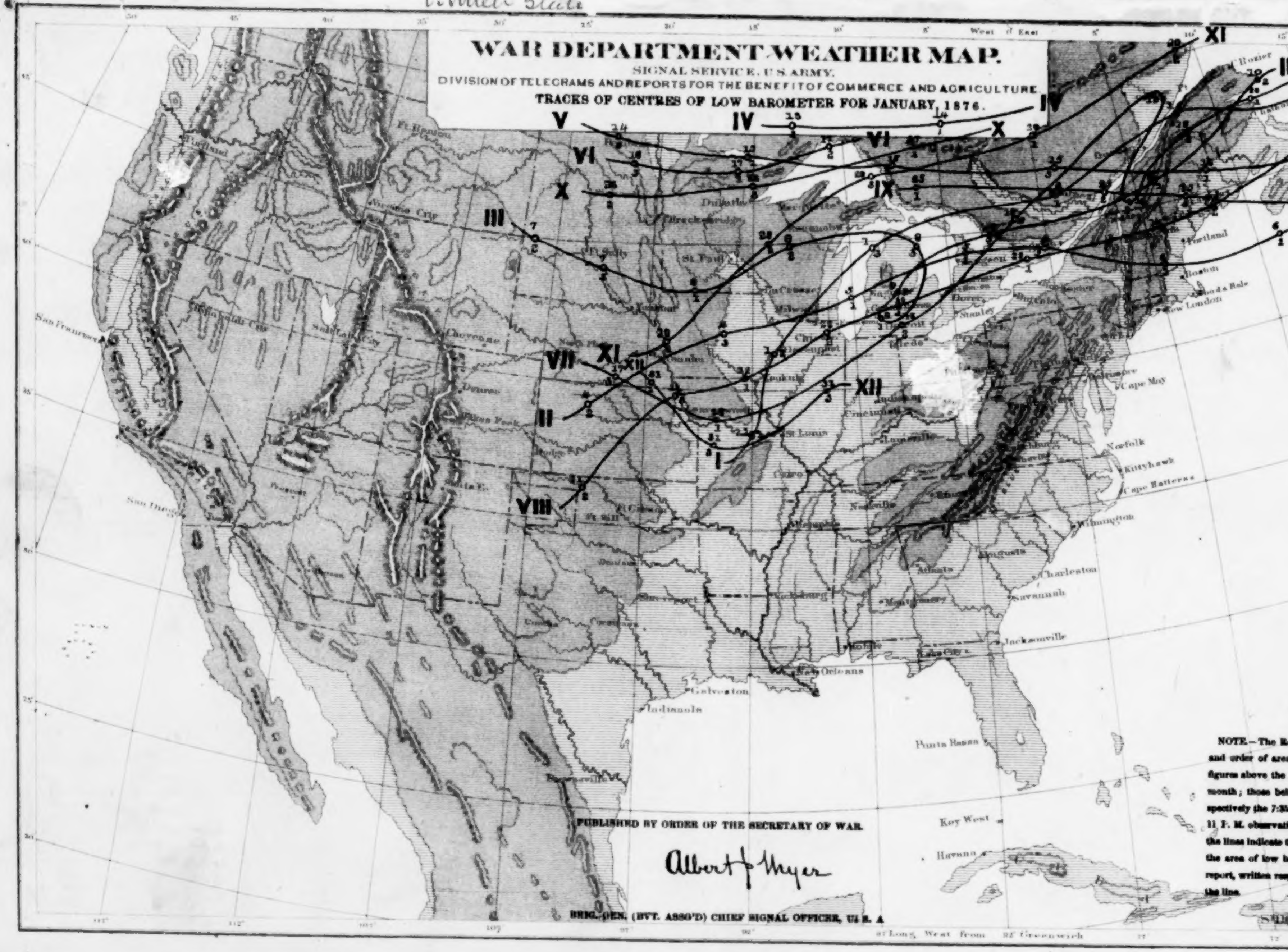
U.S. Weather Bureau

WAR DEPARTMENT WEATHER MAP.

SIGNAL SERVICE, U.S. ARMY.

DIVISION OF TELEGRAMS AND REPORTS FOR THE BENEFIT OF COMMERCE AND AGRICULTURE.

TRACKS OF CENTRES OF LOW BAROMETER FOR JANUARY, 1876.


I
II
III
IV
V
VI
VII
VIII
IX
X
XI
XII
San Francisco
San Diego
Portland
Salt Lake City
Cheyenne
Denver
Pikes Peak
Santa Fe
Omaha
St Paul
Keokuk
St Louis
Cairo
Chicago
Indianapolis
Cincinnati
Toledo
Buffalo
Nashville
Memphis
Shreveport
Galveston
Indianola
New Orleans
Mobile
Montgomery
Atlanta
Augusta
Savannah
Charleston
Jacksonville
Wilmington
Norfolk
Kittyhawk
Cape Hatteras
Cape May
New London
Boston
Portland
Halifax
Punta Rassa
Key West
Havana
S^T DOMINGO
West 0 East
Long. West from Greenwich

NOTE.—The Roman letters show number and order of areas of low barometer. The figures above the lines show the days of the month; those below, 1, 2 and 3, indicate respectively the 7:35 A. M., the 4:35 P. M., and 11 P. M. observations. The small circles on the lines indicate the position of the centre of the area of low barometer on the day and report, written respectively above and below the line.

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Albert J. Myer

BRIG. GEN. (BVT. ASSO'D) CHIEF SIGNAL OFFICER, U.S. A.

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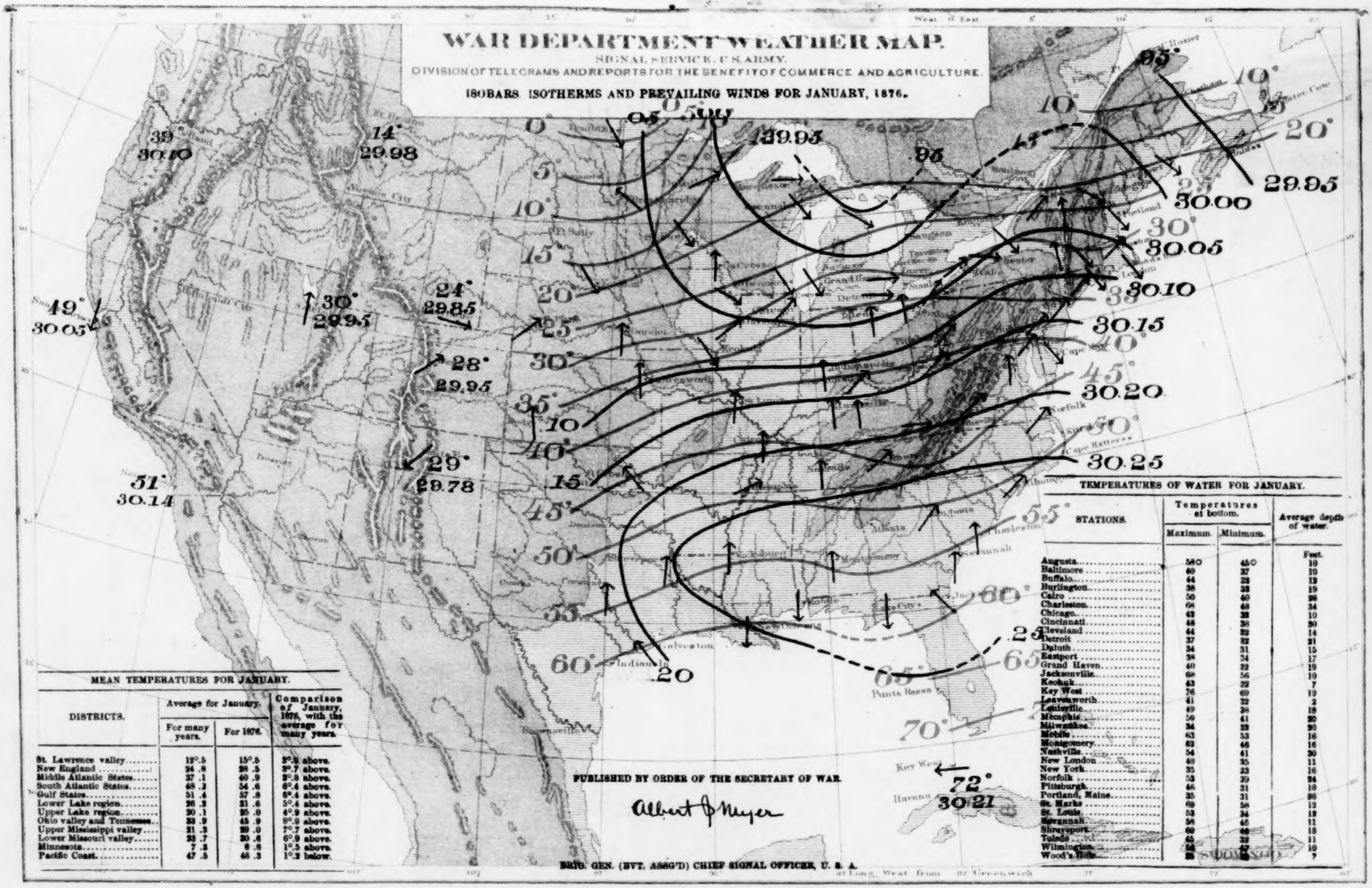
No. 11.

WAR DEPARTMENT WEATHER MAP.

SIGNAL SERVICE, U.S. ARMY.

DIVISION OF TELEGRAMS AND REPORTS FOR THE BENEFIT OF COMMERCE AND AGRICULTURE.

ISOBARS, ISOTHERMS AND PREVAILING WINDS FOR JANUARY, 1876.


39°
30.10
14°
29.98
49°
30.05
30°
29.95
24°
29.85
28°
29.95
29°
29.78
51°
30.14
0°
5°
10°
15°
20°
25°
30°
35°
40°
45°
50°
55°
60°
65°
70°
72°
30.21
29.95
30.00
30.05
30.10
30.15
30.20
30.25
Key West
Havana
Cape Hatteras
Norfolk
Portland
Galveston
Indianola
Punta Rassa
Long. West from Greenwich

MEAN TEMPERATURES FOR JANUARY.			
DISTRICTS.	Average for January.		Comparison of January, 1876, with the average for many years.
	For many years.	For 1876.	
St. Lawrence valley	12°.5	15°.5	3°.0 above.
New England	24 .8	28 .5	3°.7 above.
Middle Atlantic States	37 .1	40 .9	3°.8 above.
South Atlantic States	48 .2	54 .6	6°.4 above.
Gulf States	51 .4	57 .8	6°.4 above.
Lower Lake region	26 .2	31 .6	5°.4 above.
Upper Lake region	20 .1	25 .0	4°.9 above.
Ohio valley and Tennessee	33 .9	42 .9	9°.0 above.
Upper Mississippi valley	21 .3	29 .0	7°.7 above.
Lower Missouri valley	23 .7	30 .6	6°.9 above.
Minnesota	7 .3	8 .8	1°.5 above.
Pacific Coast	47 .5	46 .3	1°.2 below.

TEMPERATURES OF WATER FOR JANUARY.			
STATIONS.	Temperatures at bottom.		Average depth of water.
	Maximum.	Minimum.	
			Feet.
Augusta	58°	45°	10
Baltimore	40	37	10
Buffalo	44	33	13
Burlington	38	33	19
Cairo	50	40	26
Charleston	68	48	34
Chicago	43	33	10
Cincinnati	48	38	30
Cleveland	44	32	14
Detroit	37	32	21
Duluth	34	31	15
Eastport	38	34	17
Grand Haven	40	32	19
Jacksonville	68	56	10
Keokuk	43	32	7
Key West	76	60	19
Leavenworth	41	32	2
Louisville	49	38	18
Memphis	50	41	20
Milwaukee	34	33	30
Mobile	63	53	16
Montgomery	63	46	16
Nashville	54	41	30
New London	40	35	11
New York	35	33	16
Norfolk	53	39	24
Pittsburgh	46	31	10
Portland, Maine	35	31	26
St. Marks	69	58	12
St. Louis	53	34	13
Savannah	58	46	11
Shreveport	60	40	18
Toledo	45	32	11
Wilmington	58	47	10
Wood's Hole	35	33	7

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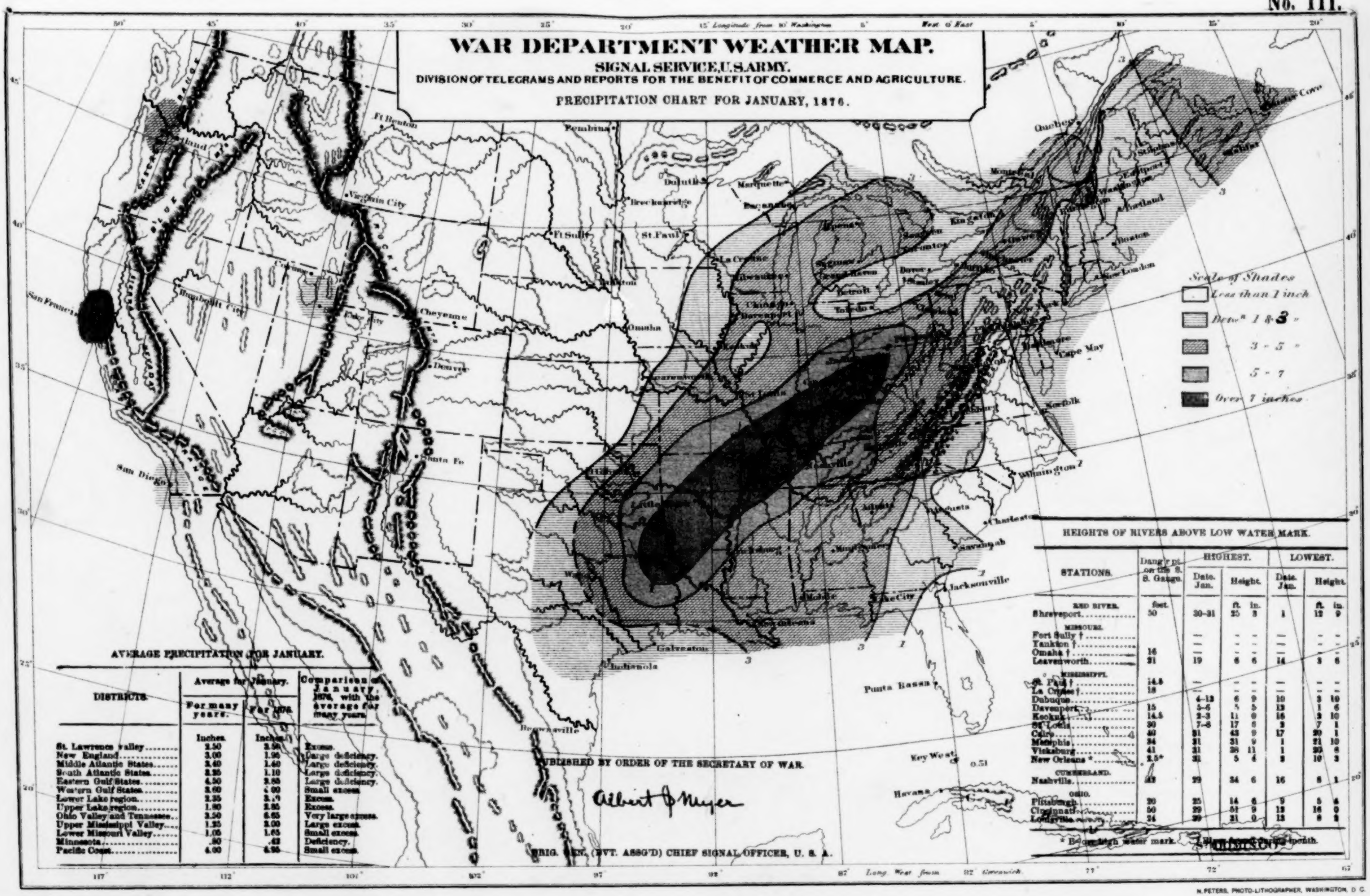
No 2

WAR DEPARTMENT WEATHER MAP.

SIGNAL SERVICE, U.S. ARMY.

DIVISION OF TELEGRAMS AND REPORTS FOR THE BENEFIT OF COMMERCE AND AGRICULTURE.

PRECIPITATION CHART FOR JANUARY, 1876.


15° Longitude from 0° Washington
West 0 East
Ft Benton
Pembina
Duluth
Marquette
Breckinridge
St. Paul
Ft Sully
Virginia City
Humboldt City
Cheyenne
Omaha
Denver
Santa Fe
San Francisco
San Diego
Galveston
Indianola
Brownsville
Punta Rassa
Key West
0.51
Havana
Jacksonville
Savannah
Charleston
Wilmington
Norfolk
Cape May
New London
Boston
Portland
Eastport
Quebec
Montreal
Kingston
Toledo
Detroit
La Crosse
Milwaukee
Chicago
Davenport
Keokuk
St. Louis
Mobile
New Orleans
Long. West from 82 Greenwich
117°
112°
107°
102°
97°
92°
87°
82°
77°
72°
67°
50°
45°
40°
35°
30°
25°
20°
1
2
3

Scale of Shades

- ☐ Less than 1 inch
- ▨ Betw.n 1 & 3 "
- ▨ " 3 - 5 "
- ▨ " 5 - 7
- ■ Over 7 inches

AVERAGE PRECIPITATION FOR JANUARY.

DISTRICTS.	Average for January.		Comparison of January, 1876, with the average for many years.
	For many years.	For 1876.	
	Inches.	Inches.	
St. Lawrence valley	2.50	2.59	Excess.
New England	3.00	1.96	Large deficiency.
Middle Atlantic States	3.40	1.60	Large deficiency.
South Atlantic States	3.35	1.10	Large deficiency.
Eastern Gulf States	4.50	2.85	Large deficiency.
Western Gulf States	3.60	4.00	Small excess.
Lower Lake region	2.35	3.19	Excess.
Upper Lake region	1.80	2.85	Excess.
Ohio Valley and Tennessee	3.50	6.65	Very large excess.
Upper Mississippi Valley	1.25	2.00	Large excess.
Lower Missouri Valley	1.05	1.65	Small excess.
Minnesota	.80	.42	Deficiency.
Pacific Coast	4.00	4.95	Small excess.

HEIGHTS OF RIVERS ABOVE LOW WATER MARK.

STATIONS.	Dang'r pt. on the S. S. Gauge.	HIGHEST.			LOWEST.		
		Date. Jan.	Height.		Date. Jan.	Height.	
	feet.		ft.	in.		ft.	in.
RED RIVER.							
Shreveport	50	30–31	25	3	1	12	9
MISSOURI.							
Fort Sully †		—	-	-	—	-	-
Yankton †		—	-	-	—	-	-
Omaha †	16	—	-	-	—	-	-
Leavenworth	21	19	6	6	14	3	6
MISSISSIPPI.							
St. Paul †	14.5	—	-	-	—	-	-
La Crosse †	18	—	-	-	—	-	-
Dubuque		4–13	6	9	10	3	10
Davenport	15	5–6	5	5	13	1	6
Keokuk	14.5	2–3	11	0	16	3	10
St. Louis	30	7–8	17	6	3	7	1
Cairo	40	31	43	9	17	20	1
Memphis	34	31	31	9	1	21	10
Vicksburg	41	31	36	11	1	20	6
New Orleans *	2.5*	31	5	4	3	10	3
CUMBERLAND.							
Nashville	43	29	34	6	16	6	1
OHIO.							
Pittsburgh	20	25	14	6	9	5	6
Cincinnati	50	29	51	9	13	16	0
Louisville	24	29	21	0	13	6	3

* Below high water mark. † River frozen during the month.

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Albert J. Myer

BRIG. GEN. (BVT. ASS'G'D) CHIEF SIGNAL OFFICER, U. S. A.

N. PETERS, PHOTO-LITHOGRAPHER, WASHINGTON, D. C.

3d 3

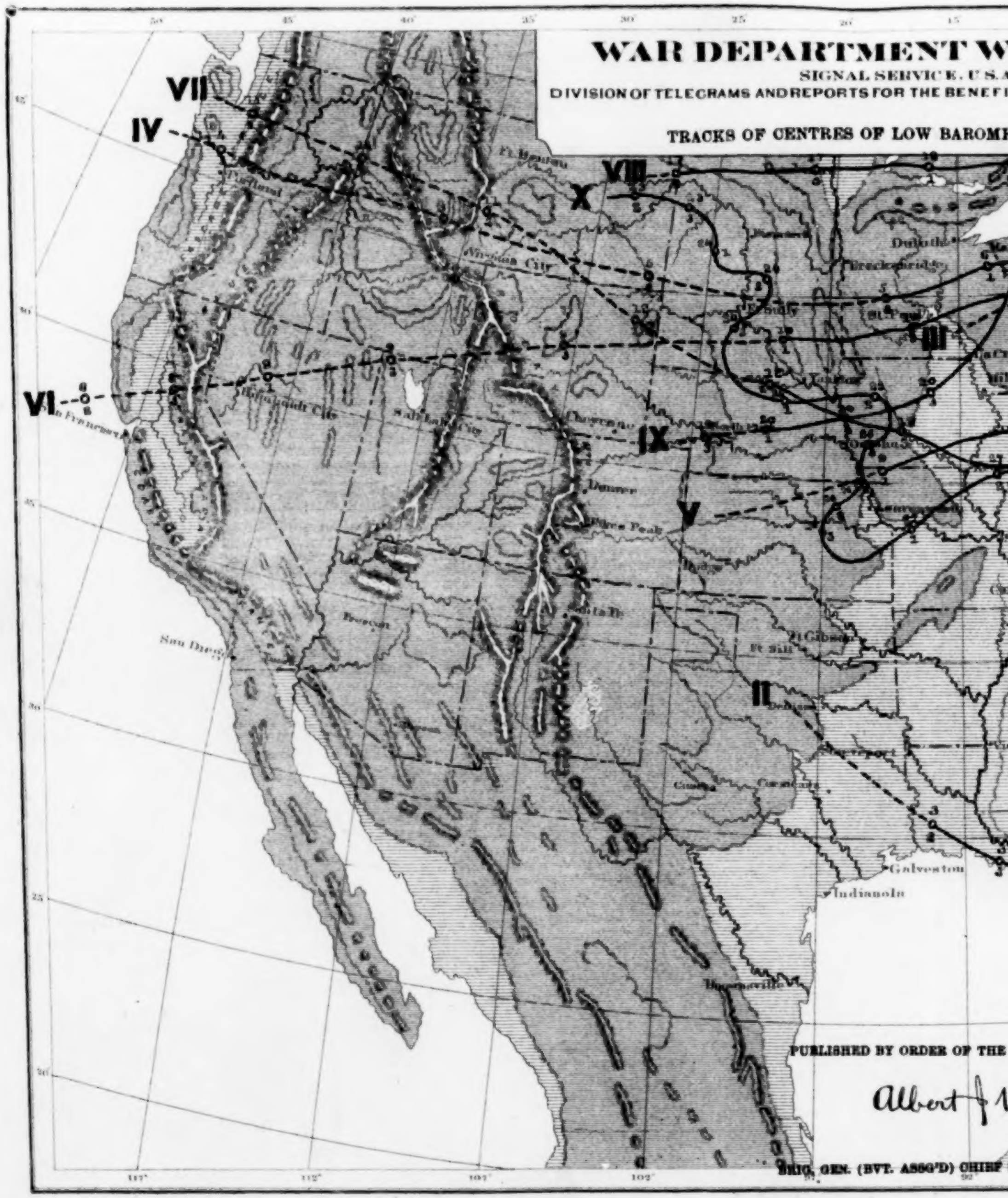
No. 1.

WAR DEPARTMENT WEATHER MAP.

SIGNAL SERVICE, U.S. ARMY.

DIVISION OF TELEGRAMS AND REPORTS FOR THE BENEFIT OF COMMERCE AND AGRICULTURE.

TRACKS OF CENTRES OF LOW BAROMETER FOR FEBRUARY, 1874.


I
II
III
IV
V
VI
VII
VIII
IX
X
West 0 East
Portland
Virginia City
Salt Lake City
San Francisco
San Diego
Cheyenne
Denver
Pikes Peak
Santa Fe
Ft. Benton
Breckenridge
Duluth
St. Paul
La Crosse
Milwaukee
Chicago
Grand Haven
Detroit
Toronto
Kingston
Oswego
Pittsburg
Indianapolis
St. Louis
Cairo
Nashville
Memphis
Ft. Gibson
Ft. Sill
Vicksburg
Mobile
New Orleans
Galveston
Indianola
Brownsville
Montgomery
Atlanta
Augusta
Charleston
Savannah
Jacksonville
Lake City
Punta Rassa
Key West
Havana
Wilmington
Cape Hatteras
Kittyhawk
Norfolk
Cape May
New London
Boston
Portland
Halifax
Chatham
Father Point
Quebec
Montreal
Greenwich
Long. West from

NOTE.—The Roman letters show number and order of areas of low barometer. The figures above the lines show the days of the month; those below, 1, 2 and 3, indicate respectively the 7:35 A. M., the 4:35 P. M., and 11 P. M. observations. The small circles on the lines indicate the position of the centre of the area of low barometer on the day and report, written respectively above and below the line.

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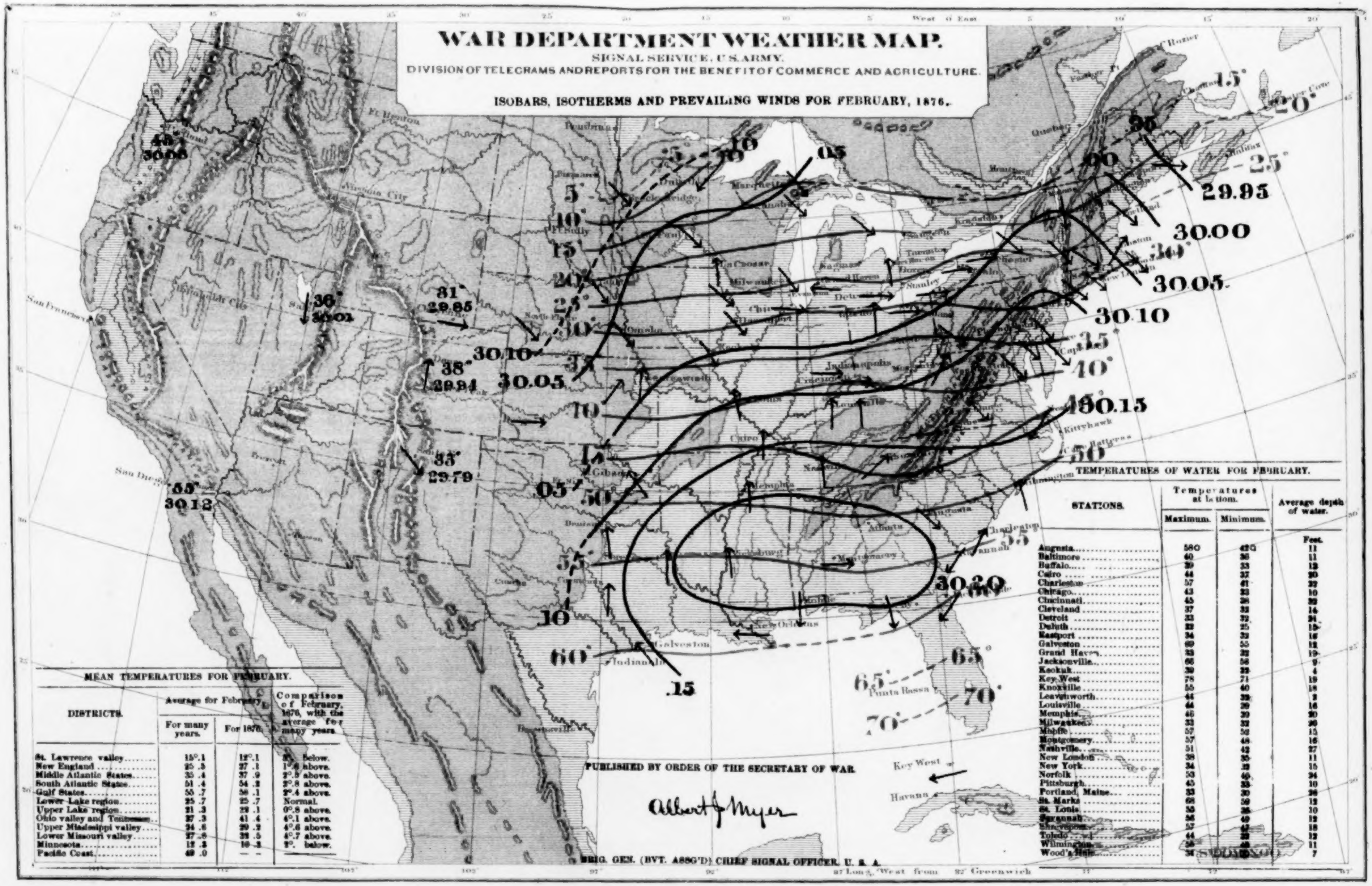
No. 11.

WAR DEPARTMENT WEATHER MAP.

SIGNAL SERVICE, U.S. ARMY.

DIVISION OF TELEGRAMS AND REPORTS FOR THE BENEFIT OF COMMERCE AND AGRICULTURE.

ISOBARS, ISOTHERMS AND PREVAILING WINDS FOR FEBRUARY, 1876.



MEAN TEMPERATURES FOR FEBRUARY.

DISTRICTS.	Average for February.		Comparison of February, 1876, with the average for many years.
	For many years.	For 1876.	
St. Lawrence valley	15°.1	12°.1	3°. below.
New England	25 .5	27 .1	1°.6 above.
Middle Atlantic States	35 .4	37 .9	2°.5 above.
South Atlantic States	51 .4	54 .2	2°.8 above.
Gulf States	55 .7	58 .1	2°.4 above.
Lower Lake region	25 .7	25 .7	Normal.
Upper Lake region	21 .3	22 .1	0°.8 above.
Ohio valley and Tennessee	37 .3	41 .4	4°.1 above.
Upper Mississippi valley	24 .6	29 .2	4°.6 above.
Lower Missouri valley	27 .8	32 .5	4°.7 above.
Minnesota	12 .3	10 .3	2°. below.
Pacific Coast	49 .0	— —	—

TEMPERATURES OF WATER FOR FEBRUARY.

STATIONS.	Temperatures at bottom.		Average depth of water.
	Maximum.	Minimum.	Feet.
Augusta	58°	42°	11
Baltimore	40	36	11
Buffalo	39	33	13
Cairo	44	37	20
Charleston	57	41	22
Chicago	43	33	10
Cincinnati	45	36	32
Cleveland	37	33	16
Detroit	33	32	24
Duluth	32	25	15
Eastport	34	33	16
Galveston	60	55	12
Grand Haven	33	32	19
Jacksonville	66	56	9
Keokuk	39	33	4
Key West	78	71	19
Knoxville	55	40	18
Leavenworth	44	33	3
Louisville	44	39	16
Memphis	46	39	20
Milwaukee	33	32	20
Mobile	57	52	15
Montgomery	57	48	16
Nashville	51	42	27
New London	39	35	11
New York	34	33	15
Norfolk	53	46	24
Pittsburgh	45	33	10
Portland, Maine	33	30	26
St. Marks	68	59	12
St. Louis	35	36	10
Savannah	56	49	12
Shreveport	57	42	18
Toledo	44	33	12
Wilmington	56	48	11
Wood's Hole	34	33	7

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Albert J. Myer

BRIG. GEN. (BVT. ASS'G'D) CHIEF SIGNAL OFFICER, U. S. A.

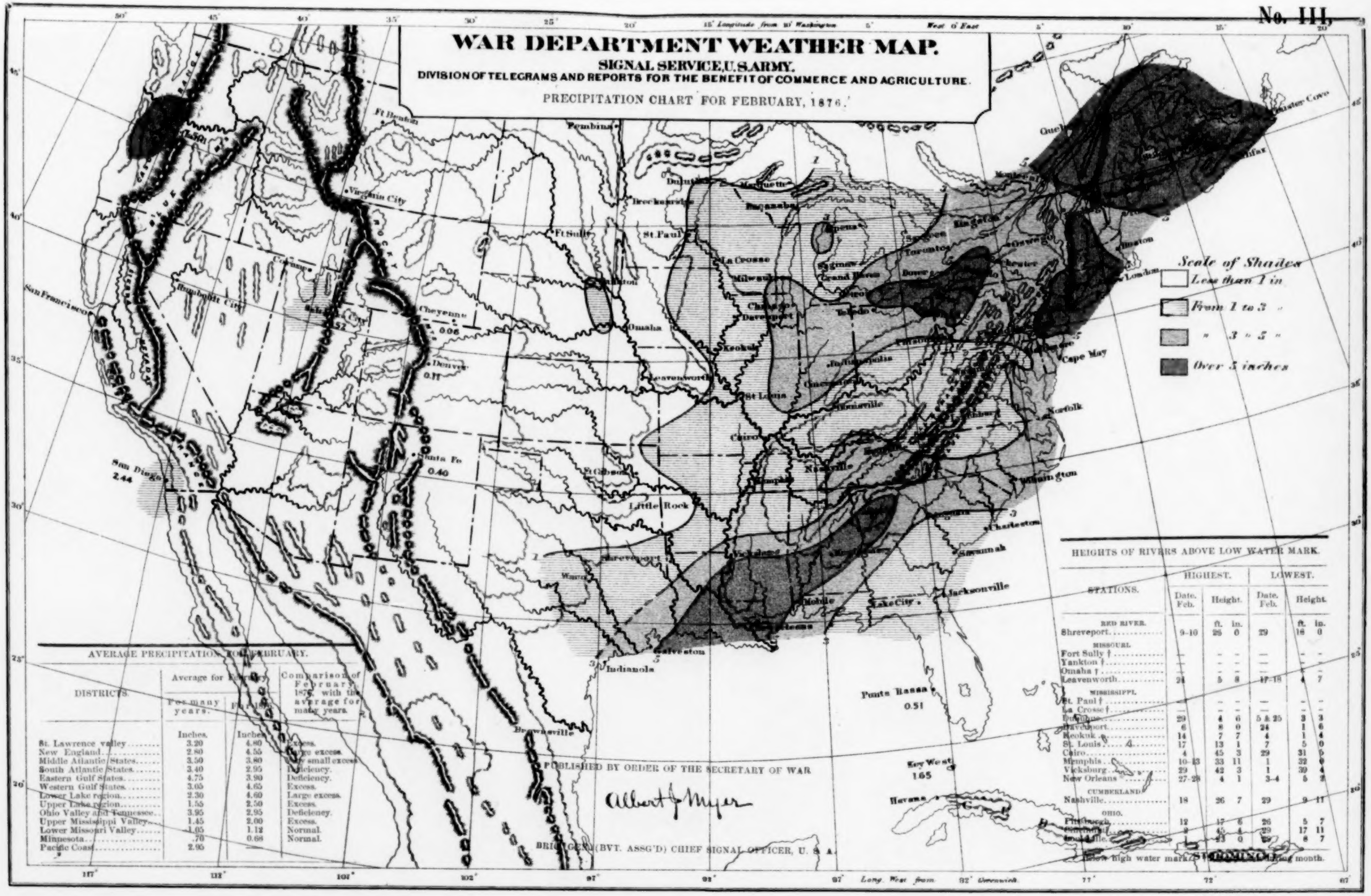
No. III.

WAR DEPARTMENT WEATHER MAP.

SIGNAL SERVICE, U.S. ARMY.

DIVISION OF TELEGRAMS AND REPORTS FOR THE BENEFIT OF COMMERCE AND AGRICULTURE.

PRECIPITATION CHART FOR FEBRUARY, 1876.


15° Longitude from Washington
West 0 East
Ft Benton
Pembina
Virginia City
Duluth
Marquette
Escanaba
Breckenridge
St. Paul
Ft Sully
La Crosse
Milwaukee
Grand Haven
Chicago
Davenport
Corinne
Humboldt City
San Francisco
Salt Lake City
Cheyenne
0.06
Omaha
Keokuk
Denver
0.11
Leavenworth
St Louis
Indianapolis
Cincinnati
Evansville
Cairo
Santa Fe
0.40
San Diego
2.44
Ft Gibson
Little Rock
Memphis
Nashville
Shreveport
Vicksburg
Montgomery
Mobile
New Orleans
Galveston
Indianola
Brownsville
Jacksonville
Lake City
Savannah
Charleston
Wilmington
Norfolk
Cape May
Pittsburgh
Toledo
Detroit
Toronto
Oswego
Rochester
Kingston
Montreal
Quebec
Boston
New London
Eastport
Halifax
Punta Rassa
0.51
Key West
1.65
Havana
St. Domingo
Long. West from Greenwich

Scale of Shades
- ☐ Less than 1 in
- ▨ From 1 to 3 "
- ▨ " 3 " 5 "
- ■ Over 5 inches

AVERAGE PRECIPITATION FOR FEBRUARY.

DISTRICTS.	Average for February.		Comparison of February, 1876, with the average for many years.
	For many years.	For 1876.	
	Inches.	Inches.	
St. Lawrence valley	3.20	4.60	Excess.
New England	2.80	4.55	Large excess.
Middle Atlantic States	3.50	3.80	Very small excess
South Atlantic States	3.40	2.95	Deficiency.
Eastern Gulf States	4.75	3.90	Deficiency.
Western Gulf States	3.05	4.65	Excess.
Lower Lake region	2.30	4.60	Large excess.
Upper Lake region	1.55	2.50	Excess.
Ohio Valley and Tennessee	3.95	2.95	Deficiency.
Upper Mississippi Valley	1.45	2.00	Excess.
Lower Missouri Valley	1.05	1.12	Normal.
Minnesota	.70	0.68	Normal.
Pacific Coast	2.95	—	

HEIGHTS OF RIVERS ABOVE LOW WATER MARK.

STATIONS.	HIGHEST.			LOWEST.		
	Date. Feb.	Height.		Date. Feb.	Height.	
		ft.	in.		ft.	in.
RED RIVER.						
Shreveport	9-10	26	0	29	16	0
MISSOURI.						
Fort Sully †	—	–	–	—	–	–
Yankton †	—	–	–	—	–	–
Omaha †	—	–	–	—	–	–
Leavenworth	24	5	8	17-18	4	7
MISSISSIPPI.						
St. Paul †	—	–	–	—	–	–
La Crosse †	—	–	–	—	–	–
Dubuque	29	4	6	5 & 25	3	3
Davenport	6	8	0	24	1	6
Keokuk	14	7	7	4	1	4
St. Louis	17	13	1	7	5	0
Cairo	4	45	3	29	31	5
Memphis	10-13	33	11	1	32	0
Vicksburg	29	42	3	1	30	4
New Orleans	27-28	4	1	3-4	5	2
CUMBERLAND.						
Nashville	18	26	7	29	9	11
OHIO.						
Pittsburgh	12	17	6	26	5	7
Cincinnati	[illegible]	45	4	29	17	11
Louisville	[illegible]	23	0	[illegible]	8	7

† Below high water mark [illegible] month.

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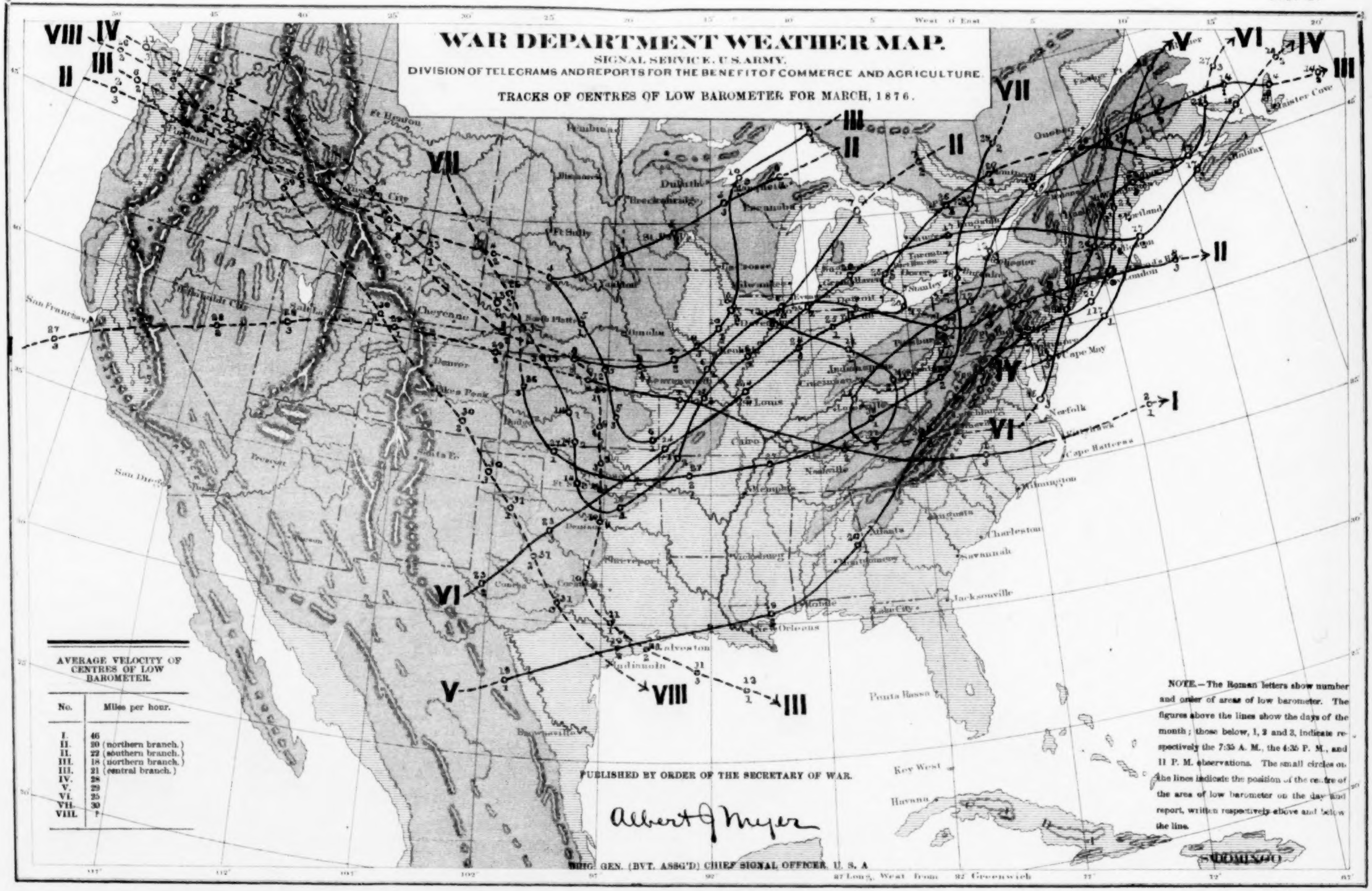
Albert J. Myer

BRIG. GEN'L (BVT. ASSG'D) CHIEF SIGNAL OFFICER, U. S. A.

N. PETERS, PHOTO-LITHOGRAPHER, WASHINGTON, D. C.

No. I.

No. I.



WAR DEPARTMENT WEATHER MAP.

SIGNAL SERVICE, U. S. ARMY.
DIVISION OF TELEGRAMS AND REPORTS FOR THE BENEFIT OF COMMERCE AND AGRICULTURE.

TRACKS OF CENTRES OF LOW BAROMETER FOR MARCH, 1876.

AVERAGE VELOCITY OF CENTRES OF LOW BAROMETER.

No.	Miles per hour.
I.	46
II.	20 (northern branch.)
II.	22 (southern branch.)
III.	18 (northern branch.)
III.	21 (central branch.)
IV.	28
V.	29
VI.	25
VII.	30
VIII.	?

NOTE.—The Roman letters show number and order of areas of low barometer. The figures above the lines show the days of the month; those below, 1, 2 and 3, indicate respectively the 7:35 A. M., the 4:35 P. M., and 11 P. M. observations. The small circles on the lines indicate the position of the centre of the area of low barometer on the day and report, written respectively above and below the line.

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BRIG. GEN. (BVT. ASSG'D) CHIEF SIGNAL OFFICER, U. S. A.

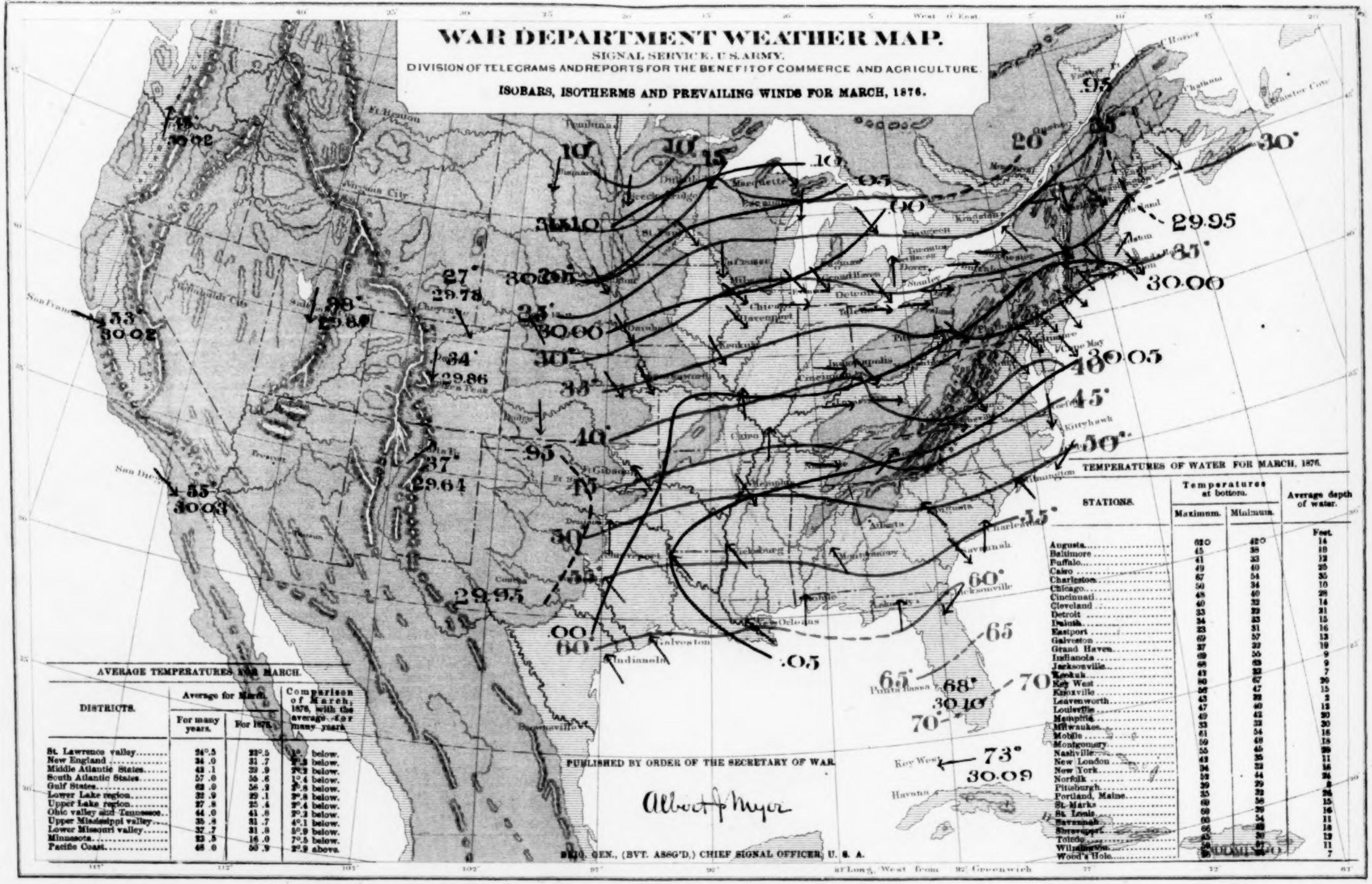
I
II
III
IV
V
VI
VII
VIII
West of East
Long. West from Greenwich
San Francisco
Portland
Salt Lake
Cheyenne
Denver
Pikes Peak
Santa Fe
San Diego
Pembina
Duluth
Breckenridge
Bismarck
Ft Sully
North Platte
Omaha
Escanaba
La Crosse
Milwaukee
Chicago
Detroit
Toronto
Buffalo
Rochester
Cincinnati
Indianapolis
St Louis
Cairo
Nashville
Memphis
Pittsburg
Louisville
Shreveport
Vicksburg
New Orleans
Mobile
Montgomery
Atlanta
Augusta
Charleston
Savannah
Jacksonville
Wilmington
Norfolk
Cape Hatteras
Cape May
Portland
Boston
Quebec
Halifax
Galveston
Indianola
Brownsville
Punta Rassa
Key West
Havana
Lake City
Corsicana
Denison
Dodge
Ft Benton
Eastport
SDOMINGO
Cape Race
Sydney

No. II.

WAR DEPARTMENT WEATHER MAP.

SIGNAL SERVICE, U.S. ARMY.
DIVISION OF TELEGRAMS AND REPORTS FOR THE BENEFIT OF COMMERCE AND AGRICULTURE.

ISOBARS, ISOTHERMS AND PREVAILING WINDS FOR MARCH, 1876.



10°
10°
15
.10
.05
.00
20°
.95
30°
29.95
35°
30.00
30.10
30.20
25°
30.00
30°
35°
40°
45°
30.05
50°
55°
60°
65
65°
68°
30.10
70°
70
73°
30.09
.05
.00
60°
29.95
.95
15
50°
27°
29.78
34°
29.86
37°
29.64
38°
29.86
33°
30.02
55°
30.03
45°
30.02
Key West
Havana
San Francisco
San Diego
Galveston
Indianola
New Orleans
Chicago
Duluth
Marquette
Kingston
Cape May
Kittyhawk
Wilmington
Jacksonville
Punta Rassa
Cheyenne
Virginia City
Ft. Benton
Pembina
West 0 East
87 Long. West from 82 Greenwich

AVERAGE TEMPERATURES FOR MARCH.

DISTRICTS.	Average for March.		Comparison of March, 1876, with the average for many years.
	For many years.	For 1876.	
St. Lawrence valley	24°.5	22°.5	2° below.
New England	34 .0	31 .7	2°.3 below.
Middle Atlantic States	42 .1	39 .9	2°.2 below.
South Atlantic States	57 .0	55 .6	1°.4 below.
Gulf States	62 .0	58 .2	3°.8 below.
Lower Lake region	32 .9	29 .1	3°.8 below.
Upper Lake region	27 .8	25 .4	2°.4 below.
Ohio valley and Tennessee	44 .0	41 .8	2°.2 below.
Upper Mississippi valley	35 .8	31 .7	4°.1 below.
Lower Missouri valley	37 .7	31 .8	5°.9 below.
Minnesota	23 .5	16 .0	7°.5 below.
Pacific Coast	48 .0	50 .9	2°.9 above.

TEMPERATURES OF WATER FOR MARCH, 1876.

STATIONS.	Temperatures at bottom.		Average depth of water.
	Maximum.	Minimum.	Feet.
Augusta	62°	42°	14
Baltimore	45	38	10
Buffalo	41	33	12
Cairo	49	40	25
Charleston	67	54	35
Chicago	50	34	10
Cincinnati	48	40	28
Cleveland	40	32	14
Detroit	33	32	21
Duluth	34	33	15
Eastport	33	31	16
Galveston	69	57	13
Grand Haven	37	32	19
Indianola	69	55	9
Jacksonville	68	62	9
Keokuk	43	32	7
Key West	80	67	20
Knoxville	56	47	15
Leavenworth	43	32	2
Louisville	47	40	13
Memphis	49	42	20
Milwaukee	33	33	20
Mobile	61	54	16
Montgomery	59	48	18
Nashville	55	46	20
New London	43	35	11
New York	34	33	16
Norfolk	53	44	24
Pittsburgh	39	29	8
Portland, Maine	35	32	26
St. Marks	60	56	15
St. Louis	60	50	16
Savannah	60	54	11
Shreveport	66	60	18
Toledo	43	30	12
Wilmington	56	52	11
Wood's Hole	35	36	7

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BRIG. GEN., (BVT. ASSG'D,) CHIEF SIGNAL OFFICER, U. S. A.

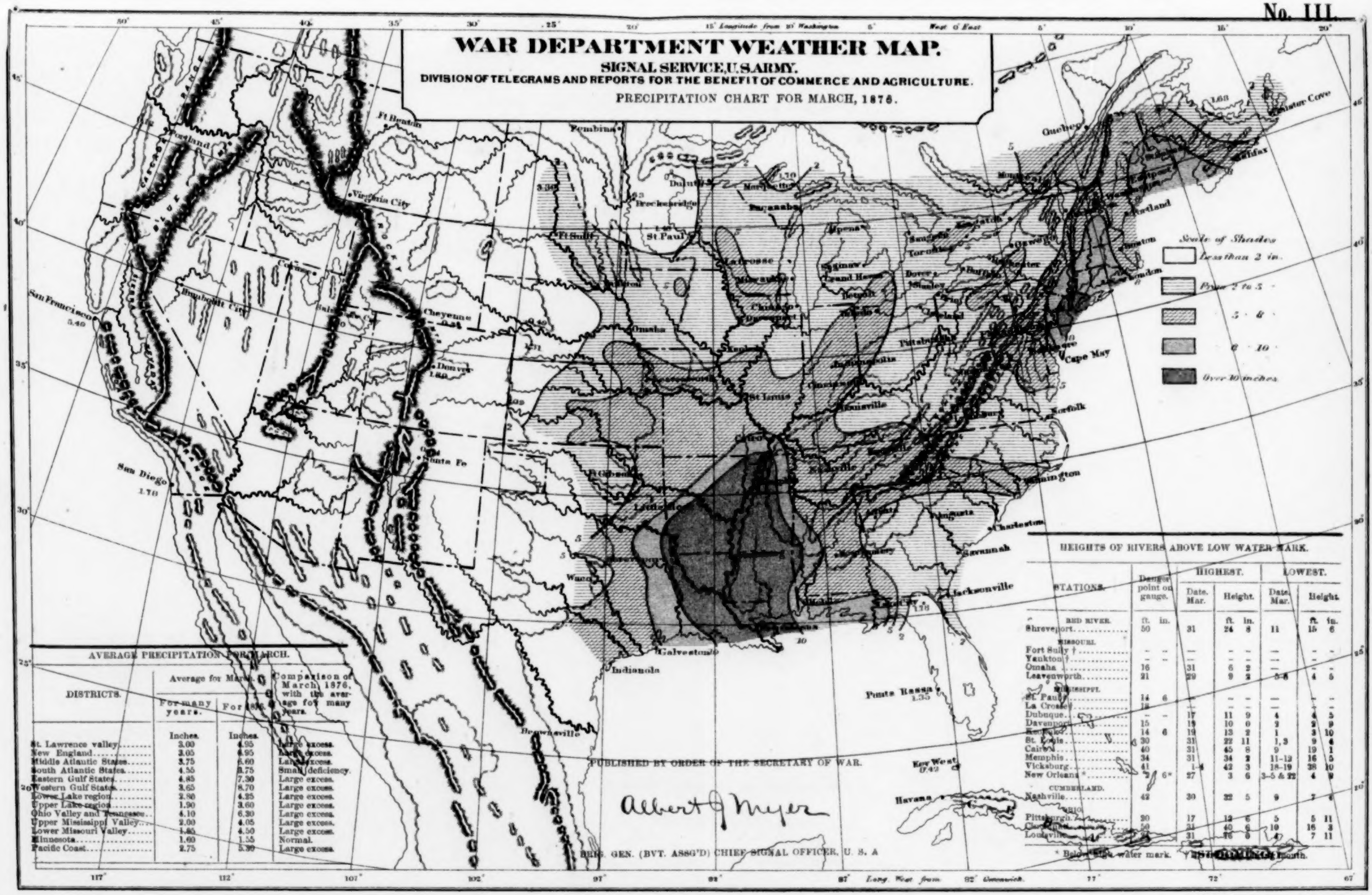
No. III.

WAR DEPARTMENT WEATHER MAP.

SIGNAL SERVICE, U. S. ARMY.

DIVISION OF TELEGRAMS AND REPORTS FOR THE BENEFIT OF COMMERCE AND AGRICULTURE.

PRECIPITATION CHART FOR MARCH, 1876.


15° Longitude from 15° Washington
West 0 East
Long. West from 82° Greenwich.
Scale of Shades
Less than 2 in.
From 2 to 5 "
5 " 8 "
8 " 10 "
Over 10 inches.
San Francisco 5.40
San Diego 1.70
Virginia City
Ft Benton
Cheyenne
Denver
Santa Fe
Pembina
Duluth
St. Paul
Breckenridge
Omaha
St Louis
Cairo
Galveston
Indianola
Brownsville
Quebec
Halifax
Portland
Cape May
Norfolk
Wilmington
Charleston
Savannah
Jacksonville
Punta Rassa 1.35
Key West
Havana

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BRIG. GEN. (BVT. ASSG'D) CHIEF SIGNAL OFFICER, U. S. A

AVERAGE PRECIPITATION FOR MARCH.

DISTRICTS.	Average for March.		Comparison of March, 1876, with the average for many years.
	For many years.	For 1876.	
	Inches.	Inches.	
St. Lawrence valley	3.00	4.95	Large excess.
New England	3.05	6.95	Large excess.
Middle Atlantic States	3.75	6.60	Large excess.
South Atlantic States	4.55	3.75	Small deficiency.
Eastern Gulf States	4.85	7.30	Large excess.
Western Gulf States	3.65	8.70	Large excess.
Lower Lake region	2.80	4.25	Large excess.
Upper Lake region	1.90	3.60	Large excess.
Ohio Valley and Tennessee	4.10	6.30	Large excess.
Upper Mississippi Valley	2.00	4.05	Large excess.
Lower Missouri Valley	1.85	4.50	Large excess.
Minnesota	1.60	1.55	Normal.
Pacific Coast	2.75	5.30	Large excess.

HEIGHTS OF RIVERS ABOVE LOW WATER MARK.

STATIONS.	Danger point on gauge.		HIGHEST.			LOWEST.		
			Date. Mar.	Height.		Date. Mar.	Height.	
RED RIVER.	ft.	in.		ft.	in.		ft.	in.
Shreveport	50		31	24	8	11	15	6
MISSOURI.								
Fort Sully †	–	–	—	–	–	—	–	–
Yankton †	–	–	—	–	–	—	–	–
Omaha	16		31	6	2	—	–	–
Leavenworth	21		29	9	2	5-8	4	5
MISSISSIPPI.								
St. Paul †	14	6	—	–	–	—	–	–
La Crosse †	12		—	–	–	—	–	–
Dubuque	–	–	17	11	9	4	4	5
Davenport	15		19	10	0	2	2	9
Keokuk	14	6	19	13	2	1	3	10
St. Louis	30		31	22	11	1, 3	9	4
Cairo	40		31	45	8	9	19	1
Memphis	34		31	34	2	11-12	16	5
Vicksburg	41		1-4	42	3	18-19	28	10
New Orleans *	2	6*	27	3	6	3-5 & 22	4	9
CUMBERLAND.								
Nashville	42		30	22	5	9	7	6
OHIO.								
Pittsburgh	20		17	12	6	5	5	11
Cincinnati	50		31	40	6	10	16	3
Louisville	[illegible]		31	16	0	4	7	11

* Below high water mark. † [illegible] month.

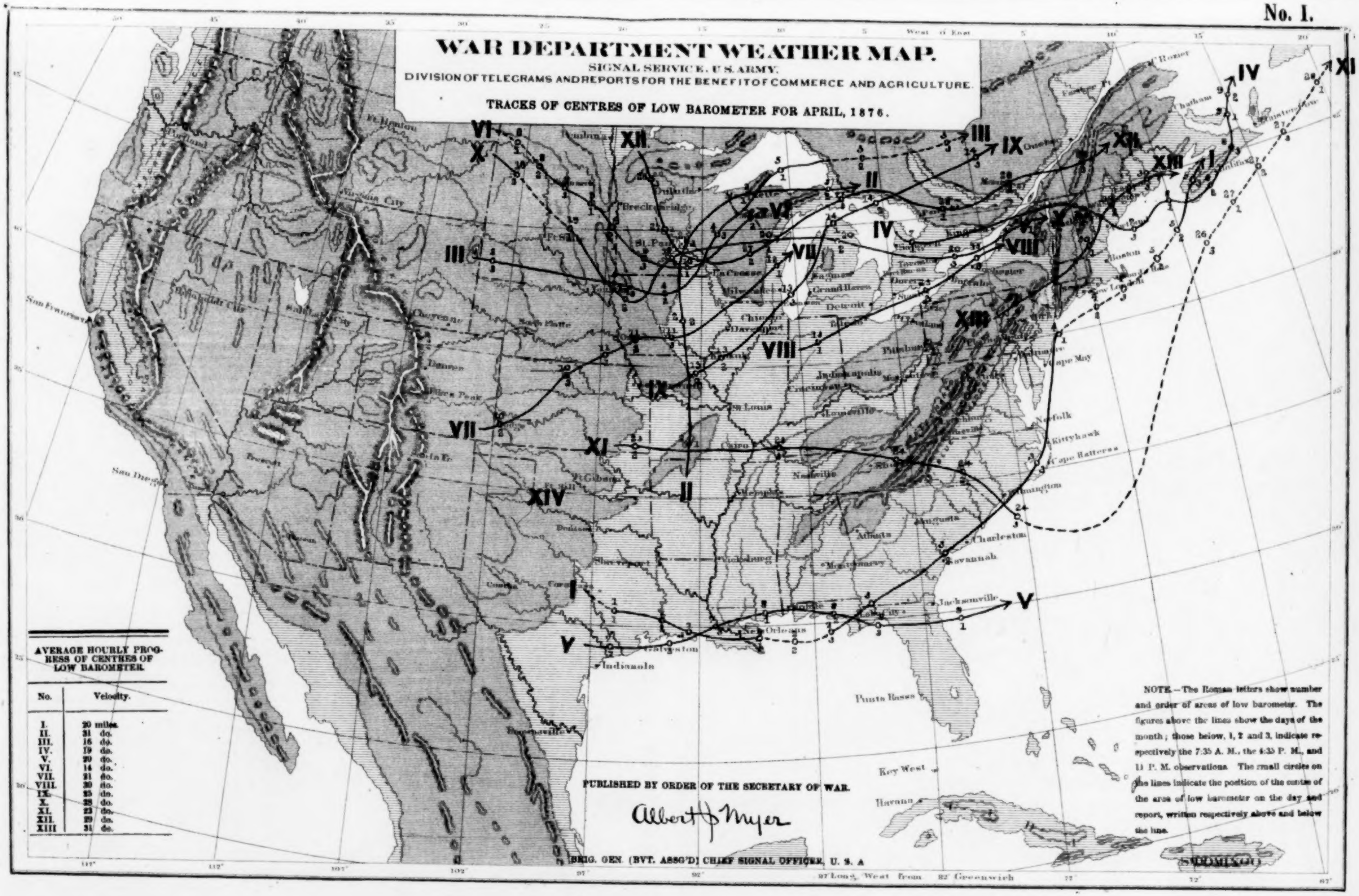
H. PETERS, PHOTO-LITHOGRAPHER, WASHINGTON, D. C.

WAR DEPARTMENT WEATHER MAP.

SIGNAL SERVICE, U.S. ARMY.

DIVISION OF TELEGRAMS AND REPORTS FOR THE BENEFIT OF COMMERCE AND AGRICULTURE.

TRACKS OF CENTRES OF LOW BAROMETER FOR APRIL, 1876.


West 0 East
VI
X
XII
III
IX
II
VII
VIII
IV
XIII
I
XI
XIV
V
Ft. Benton
Portland
Virginia City
San Francisco
San Diego
Salt Lake City
Cheyenne
North Platte
Denver
Pike's Peak
Santa Fe
Breckenridge
Duluth
St. Paul
La Crosse
Omaha
Milwaukee
Grand Haven
Chicago
Davenport
Detroit
St. Louis
Cairo
Nashville
Memphis
Ft. Gibson
Denison
Shreveport
Vicksburg
New Orleans
Galveston
Indianola
Brownsville
Indianapolis
Cincinnati
Louisville
Knoxville
Pittsburgh
Buffalo
Rochester
Toronto
Kingston
Oswego
Quebec
Boston
Chatham
Cape May
Baltimore
Norfolk
Kittyhawk
Cape Hatteras
Wilmington
Charleston
Augusta
Atlanta
Montgomery
Savannah
Jacksonville
Punta Rassa
Key West
Havana
ST. DOMINGO
117°
112°
107°
102°
97°
92°
87 Long. West from 82 Greenwich
77°
72°
67°

AVERAGE HOURLY PROGRESS OF CENTRES OF LOW BAROMETER.

No.	Velocity.
I.	20 miles.
II.	31 do.
III.	16 do.
IV.	19 do.
V.	20 do.
VI.	14 do.
VII.	21 do.
VIII.	30 do.
IX.	25 do.
X.	28 do.
XI.	23 do.
XII.	29 do.
XIII	31 do.

NOTE.—The Roman letters show number and order of areas of low barometer. The figures above the lines show the days of the month; those below, 1, 2 and 3, indicate respectively the 7:35 A. M., the 4:35 P. M., and 11 P. M. observations. The small circles on the lines indicate the position of the centre of the area of low barometer on the day and report, written respectively above and below the line.

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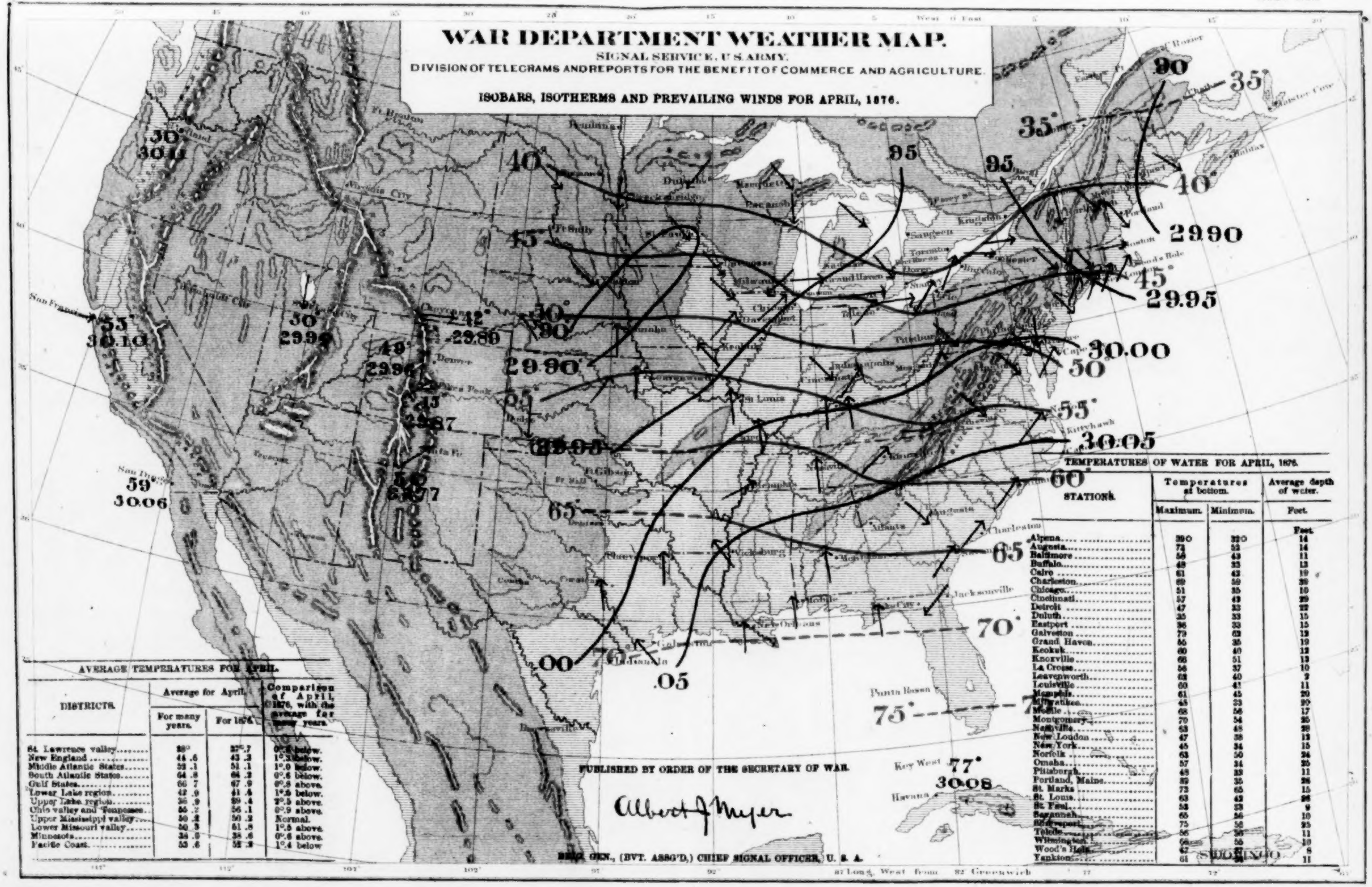
BRIG. GEN. (BVT. ASSG'D) CHIEF SIGNAL OFFICER, U. S. A.

No. 11.



WAR DEPARTMENT WEATHER MAP.

SIGNAL SERVICE, U.S. ARMY.

DIVISION OF TELEGRAMS AND REPORTS FOR THE BENEFIT OF COMMERCE AND AGRICULTURE.

ISOBARS, ISOTHERMS AND PREVAILING WINDS FOR APRIL, 1876.

90
35°
35°
95
95
40°
29.90
45°
29.95
30.00
50°
55°
30.05
60°
65
70°
75°
77°
30.08
Key West
Havana
Punta Rassa
.05
.00
76
65
40°
45°
30°
29.90
42°
29.80
49°
29.96
43
29.87
59°
30.06
55°
30.10
30°
30.11
30°
29.99
Charleston
Jacksonville
New Orleans
Vicksburg
Shreveport
St. Louis
Indianapolis
Cincinnati
Pittsburg
Chicago
Milwaukee
Omaha
Denver
Pikes Peak
Santa Fe
Cheyenne
Salt Lake City
Virginia City
Ft. Benton
Bismarck
Duluth
St. Paul
Marquette
Escanaba
Grand Haven
Toronto
Buffalo
Kingston
Portland
Boston
Wood's Hole
Halifax
San Francisco
San Diego
Galveston
Indianola
Mobile
Augusta
Atlanta
Memphis
Kittyhawk
Cape May
West from Greenwich

AVERAGE TEMPERATURES FOR APRIL.

DISTRICTS.	Average for April.		Comparison of April, 1876, with the average for many years.
	For many years.	For 1876.	
St. Lawrence valley	28°	27°.7	0°.3 below.
New England	44 .6	43 .3	1°.3 below.
Middle Atlantic States	52 .1	51 .1	1°.0 below.
South Atlantic States	64 .8	64 .2	0°.6 below.
Gulf States	66 .7	67 .2	0°.5 above.
Lower Lake region	42 .9	41 .4	1°.5 below.
Upper Lake region	36 .9	39 .4	2°.5 above.
Ohio valley and Tennessee	55 .2	56 .1	0°.9 above.
Upper Mississippi valley	50 .2	50 .2	Normal.
Lower Missouri valley	50 .3	51 .8	1°.5 above.
Minnesota	38 .0	38 .6	0°.6 above.
Pacific Coast	53 .6	52 .2	1°.4 below

TEMPERATURES OF WATER FOR APRIL, 1876.

STATIONS.	Temperatures at bottom.		Average depth of water.
	Maximum.	Minimum.	Feet.
			Feet.
Alpena	39°	32°	14
Augusta	72	52	14
Baltimore	56	43	11
Buffalo	48	33	12
Cairo	61	43	19
Charleston	69	59	30
Chicago	51	35	10
Cincinnati	57	43	29
Detroit	47	33	22
Duluth	35	33	15
Eastport	36	33	15
Galveston	79	62	12
Grand Haven	55	35	19
Keokuk	60	40	12
Knoxville	66	51	13
La Crosse	56	37	10
Leavenworth	62	40	9
Louisville	60	41	11
Memphis	61	45	20
Milwaukee	45	33	20
Mobile	68	56	17
Montgomery	70	54	25
Nashville	53	48	28
New London	47	38	13
New York	45	34	15
Norfolk	63	50	24
Omaha	57	34	25
Pittsburgh	48	33	11
Portland, Maine	39	35	28
St. Marks	73	65	15
St. Louis	63	42	26
St. Paul	53	33	9
Savannah	65	56	10
Shreveport	75	56	25
Toledo	56	35	11
Wilmington	66	56	10
Wood's Hole	47	37	8
Yankton	61	33	11

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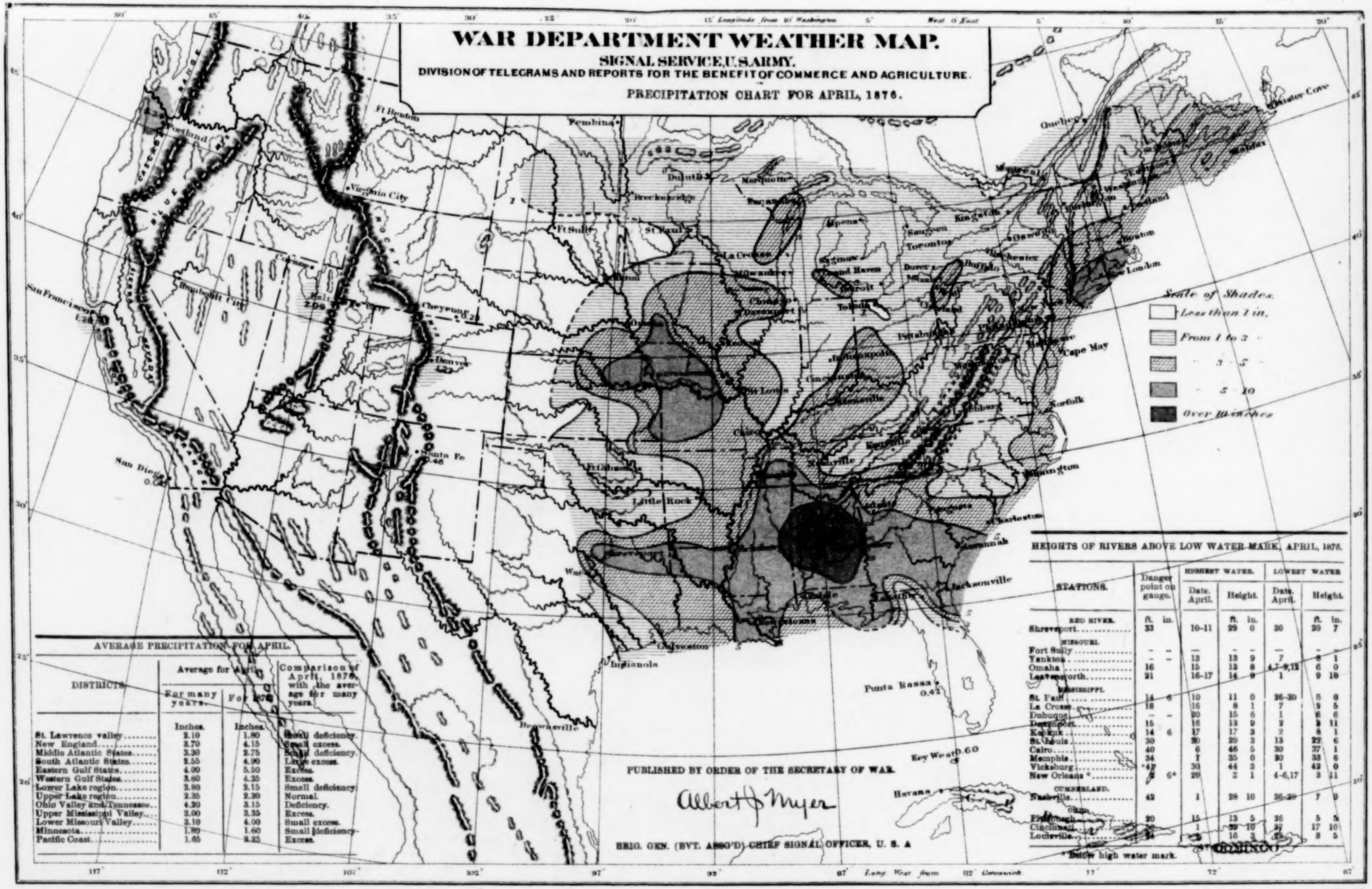
No. III.



WAR DEPARTMENT WEATHER MAP.

SIGNAL SERVICE, U.S. ARMY.

DIVISION OF TELEGRAMS AND REPORTS FOR THE BENEFIT OF COMMERCE AND AGRICULTURE.

PRECIPITATION CHART FOR APRIL, 1876.

Scale of Shades.

- ☐ *Less than 1 in.*
- ▨ *From 1 to 3 "*
- ▨ *" 3 " 5 "*
- ▨ *" 5 " 10 "*
- ■ *Over 10 inches*

15° Longitude from 0° Washington 5° West 0 East 5° 10° 15° 20°
Ft Benton
Pembina
Duluth
Marquette
Breckenridge
Virginia City
Ft Sully
St. Paul
La Crosse
Milwaukee
Grand Haven
Detroit
Toledo
Toronto
Kingston
Montreal
Quebec
Halifax
Boston
London
Cape May
Norfolk
Wilmington
Charleston
Savannah
Jacksonville
Punta Rassa 0.42
Key West 0.60
Havana
San Francisco
San Diego
Santa Fe
Denver
Cheyenne
Humboldt City
Portland
Little Rock
St. Louis
Nashville
Galveston
Indianola
Brownsville
ROCKY
SIERRA NEVADA
117° 112° 107° 102° 97° 92° 87° Long West from 82° Greenwich 77° 72° 67°

AVERAGE PRECIPITATION FOR APRIL.

DISTRICTS.	Average for April. For many years.	Average for April. For 1876.	Comparison of April, 1876, with the average for many years.
	Inches.	Inches.	
St. Lawrence valley	2.10	1.80	Small deficiency.
New England	3.70	4.15	Small excess.
Middle Atlantic States	3.30	2.75	Small deficiency.
South Atlantic States	2.55	4.90	Large excess.
Eastern Gulf States	4.00	5.50	Excess.
Western Gulf States	3.60	4.35	Excess.
Lower Lake region	2.80	2.15	Small deficiency.
Upper Lake region	2.35	2.30	Normal.
Ohio Valley and Tennessee	4.20	3.15	Deficiency.
Upper Mississippi Valley	2.00	3.35	Excess.
Lower Missouri Valley	3.10	4.00	Small excess.
Minnesota	1.80	1.60	Small deficiency.
Pacific Coast	1.65	2.25	Excess.

HEIGHTS OF RIVERS ABOVE LOW WATER MARK, APRIL, 1876.

STATIONS.	Danger point on gauge.		HIGHEST WATER. Date. April.	HIGHEST WATER. Height.		LOWEST WATER. Date. April.	LOWEST WATER. Height.	
RED RIVER.	ft.	in.		ft.	in.		ft.	in.
Shreveport	33		10-11	29	0	30	20	7
MISSOURI.								
Fort Sully	–	–	—	–	–	—	–	–
Yankton	–	–	13	13	9	7	8	1
Omaha	16		15	13	8	4,7–9,12	6	0
Leavenworth	21		16-17	14	9	1	9	10
MISSISSIPPI.								
St. Paul	14	6	10	11	0	26-30	8	0
La Crosse	18		16	8	1	7	3	5
Dubuque	–	–	20	15	6	1	6	6
Davenport	15		16	13	9	7	3	11
Keokuk	14	6	17	17	3	2	8	1
St. Louis	30		20	29	3	13	22	6
Cairo	40		6	46	5	30	37	1
Memphis	34		7	35	0	30	33	6
Vicksburg	*47		30	44	3	1	42	0
New Orleans *	3	6*	29	2	1	4-6,17	3	11
CUMBERLAND.								
Nashville	42		1	28	10	26-29	7	0
OHIO.								
Pittsburgh	20		15	13	5	26	5	5
Cincinnati	50		1	30	10	27	17	10
Louisville	24		23	16	3	30	8	5

* Below high water mark.

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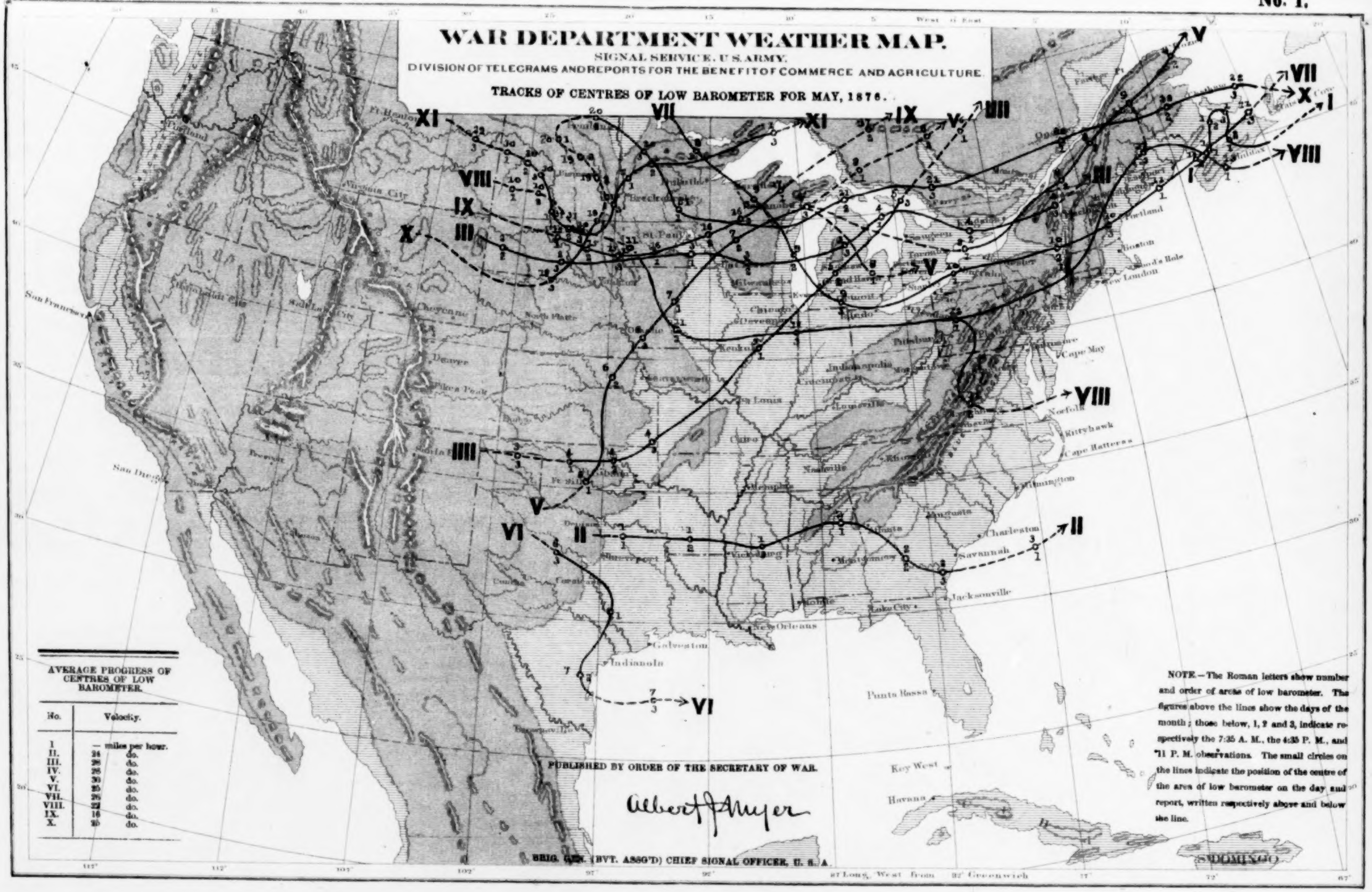
Albert J. Myer

BRIG. GEN. (BVT. ASSO'D) CHIEF SIGNAL OFFICER, U. S. A.

H. PETERS, PHOTO-LITHOGRAPHER, WASHINGTON, D. C.

No. I.


XI
VII
VIII
IX
X
III
IIII
V
VI
II
I
Portland
Virginia City
Ft. Benton
Bismarck
Breckenridge
St. Paul
Duluth
Milwaukee
Chicago
Davenport
Keokuk
St. Louis
Cairo
Nashville
Memphis
Vicksburg
Shreveport
New Orleans
Galveston
Indianola
Corsicana
Mobile
Montgomery
Savannah
Charleston
Jacksonville
Lake City
Augusta
Wilmington
Cape Hatteras
Kittyhawk
Norfolk
Cape May
Baltimore
Pittsburg
Cincinnati
Indianapolis
Louisville
Toledo
Detroit
Grand Haven
Buffalo
Oswego
Rochester
Toronto
Montreal
Quebec
Portland
Boston
Wood's Hole
New London
Halifax
Cheyenne
North Platte
Denver
Pike's Peak
Santa Fe
Salt Lake City
Camp Bidwell
San Francisco
San Diego
Punta Rassa
Key West
Havana
St. Domingo
West from Greenwich

WAR DEPARTMENT WEATHER MAP.

SIGNAL SERVICE, U. S. ARMY.

DIVISION OF TELEGRAMS AND REPORTS FOR THE BENEFIT OF COMMERCE AND AGRICULTURE.

TRACKS OF CENTRES OF LOW BAROMETER FOR MAY, 1876.

AVERAGE PROGRESS OF CENTRES OF LOW BAROMETER.

No.	Velocity.
I.	— miles per hour.
II.	24 do.
III.	28 do.
IV.	28 do.
V.	30 do.
VI.	25 do.
VII.	26 do.
VIII.	22 do.
IX.	16 do.
X.	25 do.

NOTE.—The Roman letters show number and order of areas of low barometer. The figures above the lines show the days of the month; those below, 1, 2 and 3, indicate respectively the 7:35 A. M., the 4:35 P. M., and 11 P. M. observations. The small circles on the lines indicate the position of the centre of the area of low barometer on the day and report, written respectively above and below the line.

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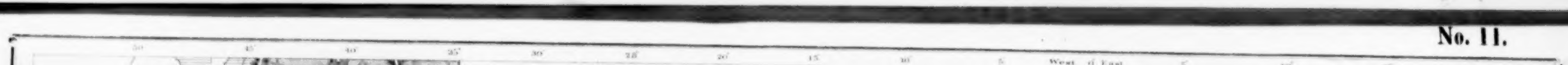
Albert J. Myer

BRIG. GEN. (BVT. ASSG'D) CHIEF SIGNAL OFFICER, U. S. A.

No. 11.


50
45
40
35
30
25
20
15
10
5
West 0 East

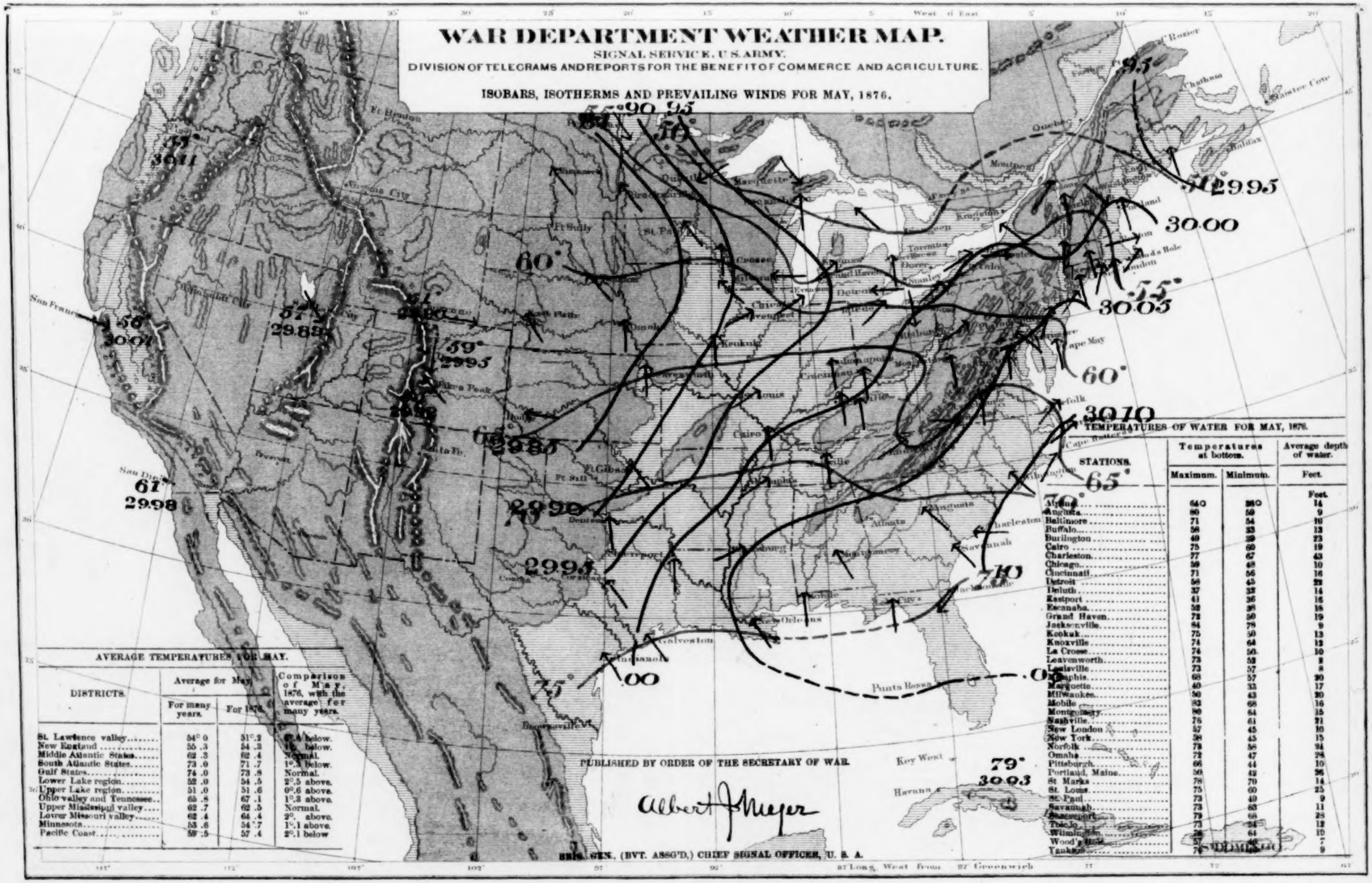
No. 11.

WAR DEPARTMENT WEATHER MAP.

SIGNAL SERVICE, U. S. ARMY.

DIVISION OF TELEGRAMS AND REPORTS FOR THE BENEFIT OF COMMERCE AND AGRICULTURE.

ISOBARS, ISOTHERMS AND PREVAILING WINDS FOR MAY, 1876.


55° 90 95
50°
60°
30.11
56°
30.07
57°
29.85
59°
29.95
29.85
61°
29.98
29.90
29.95
75°
.00
.05
79°
30.03
65°
70°
30.10
60°
55°
30.05
30.00
29.95
95
San Francisco
San Diego
Ft. Benton
Virginia City
Pike's Peak
Santa Fe
St. Paul
La Crosse
Keokuk
St. Louis
Cairo
Chicago
Detroit
Marquette
Duluth
Toledo
Cincinnati
Indianapolis
Pittsburgh
Omaha
North Platte
Ft. Sully
Ft. Gibson
Ft. Sill
Denison
Shreveport
Corsicana
Galveston
Indianola
Brownsville
New Orleans
Mobile
Montgomery
Atlanta
Augusta
Savannah
Charleston
Jacksonville
Punta Rassa
Key West
Havana
Wilmington
Cape Hatteras
Norfolk
Cape May
Kingston
Toronto
Montreal
Quebec
Halifax
Chatham
Cape Rozier
Father Point
Portland
Boston
Wood's Hole
New London
Albany
Buffalo
West 0 East
Long. West from Greenwich

AVERAGE TEMPERATURES FOR MAY.			
DISTRICTS.	Average for May.		Comparison of May, 1876, with the average for many years.
	For many years.	For 1876.	
St. Lawrence valley	54° 0	51°.2	[illegible] below.
New England	55 .3	54 .3	1°. below.
Middle Atlantic States	62 .3	62 .4	Normal.
South Atlantic States	73 .0	71 .7	1°.3 below.
Gulf States	74 .0	73 .8	Normal.
Lower Lake region	52 .0	54 .5	2°.5 above.
Upper Lake region	51 .0	51 .6	0°.6 above.
Ohio valley and Tennessee	65 .8	67 .1	1°.3 above.
Upper Mississippi valley	62 .7	62 .5	Normal.
Lower Missouri valley	62 .4	64 .4	2°. above.
Minnesota	53 .6	54°.7	1°.1 above.
Pacific Coast	59 .5	57 .4	2°.1 below

TEMPERATURES OF WATER FOR MAY, 1876.			
STATIONS.	Temperatures at bottom.		Average depth of water.
	Maximum.	Minimum.	Feet.
			Feet.
Alpena	64°	38°	14
Augusta	80	59	9
Baltimore	71	54	10
Buffalo	58	33	13
Burlington	49	39	23
Cairo	75	60	19
Charleston	77	67	43
Chicago	59	48	10
Cincinnati	71	56	16
Detroit	56	45	22
Duluth	37	32	14
Eastport	41	36	16
Escanaba	52	36	18
Grand Haven	72	50	19
Jacksonville	84	78	9
Keokuk	75	50	13
Knoxville	74	64	13
La Crosse	74	50	10
Leavenworth	73	52	8
Louisville	73	57	8
Memphis	68	57	20
Marquette	40	33	17
Milwaukee	50	43	20
Mobile	82	66	16
Montgomery	80	64	15
Nashville	76	61	21
New London	57	45	10
New York	58	45	15
Norfolk	78	56	24
Omaha	72	47	28
Pittsburgh	66	44	10
Portland, Maine	50	42	26
St Marks	78	70	14
St. Louis	75	60	25
St. Paul	73	49	9
Savannah	78	65	11
Shreveport	79	66	28
Toledo	73	54	12
Wilmington	[illegible]	64	10
Wood's Hole	57	46	7
Yankton	76	[illegible]	9

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Albert J Myer

BRIG. GEN., (BVT. ASSG'D,) CHIEF SIGNAL OFFICER, U. S. A.

No. III.

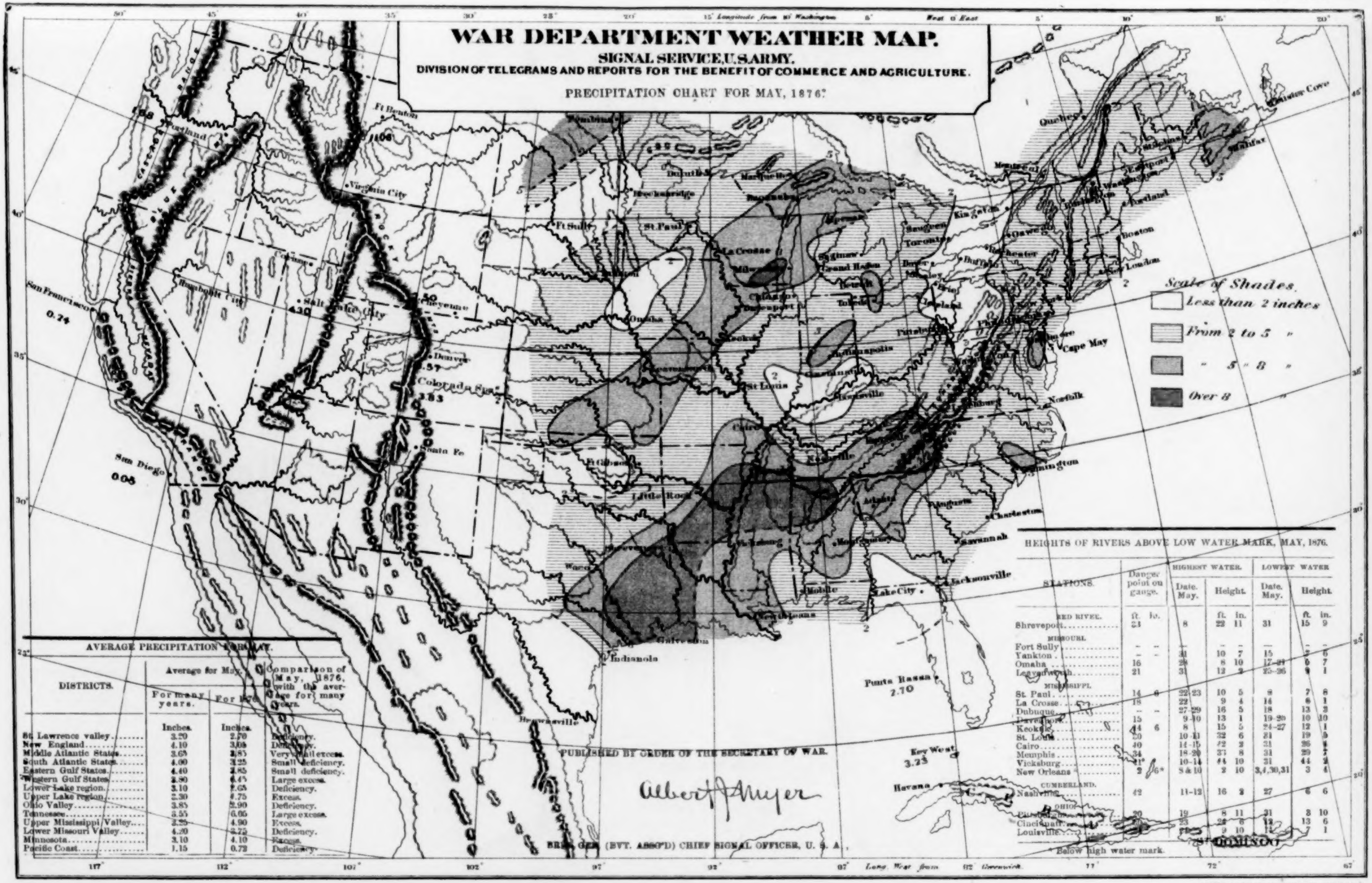
50'
45'
40'
35'
30'
25'
20'
15' Longitude from W. Washington
5'
East 0 East

WAR DEPARTMENT WEATHER MAP.

SIGNAL SERVICE, U.S. ARMY.

DIVISION OF TELEGRAMS AND REPORTS FOR THE BENEFIT OF COMMERCE AND AGRICULTURE.

PRECIPITATION CHART FOR MAY, 1876.


Scale of Shades.
Less than 2 inches
From 2 to 5 "
" 5 " 8 "
Over 8
San Francisco
0.74
San Diego
0.08
Salt Lake City
4.30
Cheyenne
Denver
Colorado Spgs.
3.83
Santa Fe
Ft Benton
Virginia City
Humboldt City
Portland
Ft Sully
St Paul
La Crosse
Milwaukee
Chicago
Davenport
Omaha
Keokuk
St Louis
Cairo
Little Rock
Ft Gibson
Galveston
Indianola
Brownsville
New Orleans
Mobile
Lake City
Jacksonville
Savannah
Charleston
Wilmington
Norfolk
Cape May
Boston
New London
Portland
Quebec
Montreal
Kingston
Toronto
Buffalo
Rochester
Oswego
Cleveland
Toledo
Detroit
Grand Haven
Escanaba
Marquette
Duluth
Breckenridge
Pembina
Indianapolis
Cincinnati
Louisville
Nashville
Pittsburgh
Atlanta
Montgomery
Augusta
Punta Rassa
2.70
Key West
3.23
Havana
St Domingo
Halifax
Eastport
Long. West from Washington
Long. West from Greenwich
117°
112°
107°
102°
97°
92°
87°
82°
77°
72°
67°

AVERAGE PRECIPITATION FOR MAY.

DISTRICTS.	Average for May.		Comparison of May, 1876, with the average for many years.
	For many years.	For 1876.	
	Inches.	Inches.	
St. Lawrence valley	3.20	2.70	Deficiency.
New England	4.10	3.06	Deficiency.
Middle Atlantic States	3.65	3.85	Very small excess.
South Atlantic States	4.00	3.25	Small deficiency.
Eastern Gulf States	4.40	3.85	Small deficiency.
Western Gulf States	2.80	6.45	Large excess.
Lower Lake region	3.10	2.65	Deficiency.
Upper Lake region	2.30	4.75	Excess.
Ohio Valley	3.85	2.90	Deficiency.
Tennessee	3.55	6.06	Large excess.
Upper Mississippi Valley	2.25	4.90	Excess.
Lower Missouri Valley	4.20	2.75	Deficiency.
Minnesota	3.10	4.10	Excess.
Pacific Coast	1.15	0.72	Deficiency.

HEIGHTS OF RIVERS ABOVE LOW WATER MARK, MAY, 1876.

STATIONS.	Danger point on gauge.		HIGHEST WATER.			LOWEST WATER		
			Date. May.	Height.		Date. May.	Height.	
	ft.	in.		ft.	in.		ft.	in.
RED RIVER.								
Shreveport	24		8	22	11	31	15	9
MISSOURI.								
Fort Sully	–	–	–	–	–	—	–	–
Yankton	–	–	31	10	7	15	5	6
Omaha	16		29	8	10	17-21	6	7
Leavenworth	21		31	12	2	25-26	9	1
MISSISSIPPI.								
St. Paul	14	6	22-23	10	5	8	7	8
La Crosse	18		22	9	4	14	6	1
Dubuque	–	–	27-29	16	5	18	13	3
Davenport	15		9-10	13	1	19-20	10	10
Keokuk	14	6	8	15	5	24-27	12	1
St. Louis	30		10-11	32	6	31	19	5
Cairo	40		14-15	42	2	31	26	1
Memphis	34		18-20	37	8	31	29	7
Vicksburg	41*		10-14	44	10	31	44	2
New Orleans	2	6*	8 & 10	2	10	3,4,30,31	3	4
CUMBERLAND.								
Nashville	42		11-12	16	2	27	6	6
OHIO.								
Pittsburgh	20		19	8	11	31	3	10
Cincinnati	[illegible]		23	22	6	12	13	6
Louisville	[illegible]		[illegible]	9	10	12	7	1

* Below high water mark.

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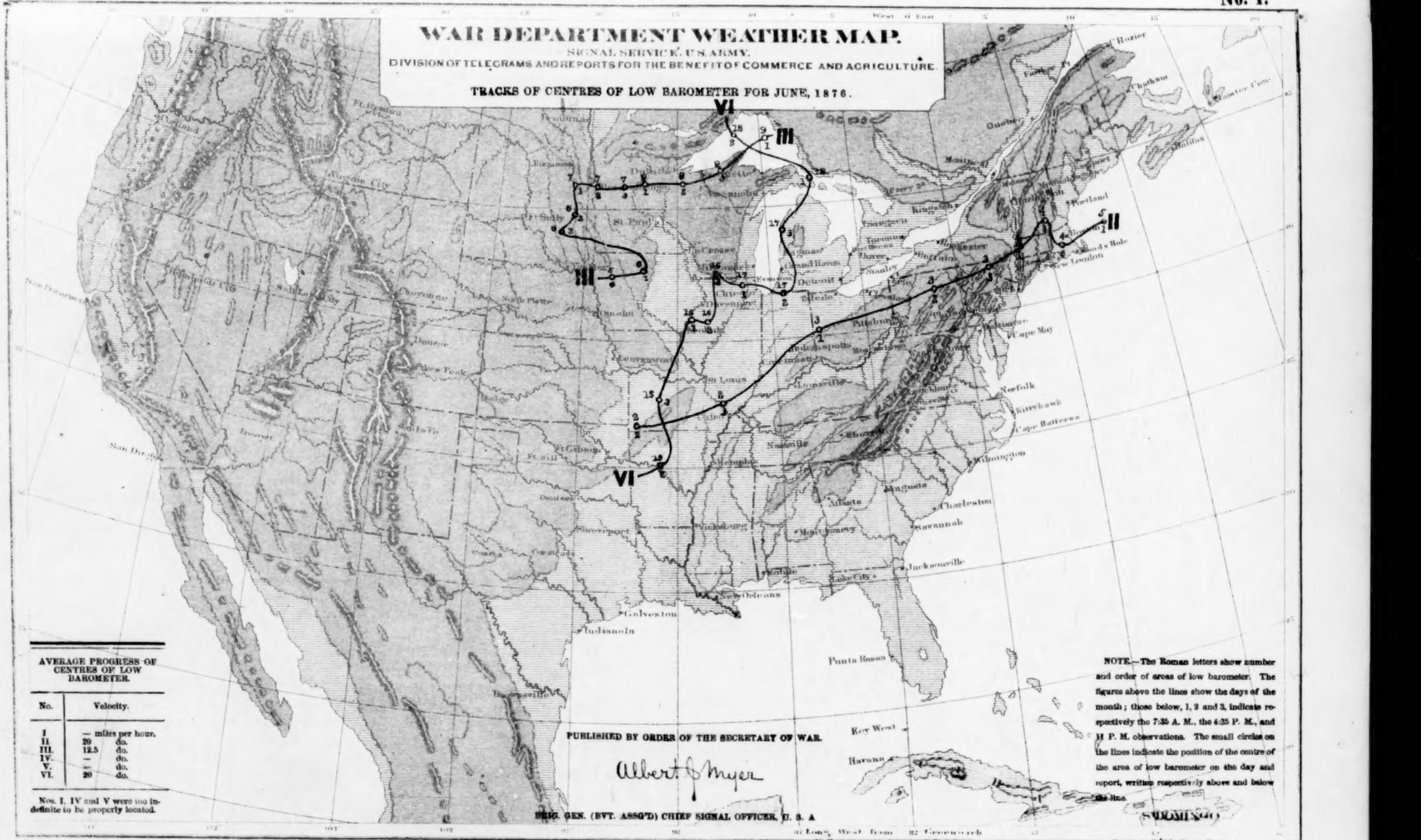
Albert J Myer

BRIG. GEN. (BVT. ASSG'D) CHIEF SIGNAL OFFICER, U. S. A.

N. PETERS, PHOTO-LITHOGRAPHER, WASHINGTON, D. C.

No. 1.

No. 1.


VI
III
II
VI
III
Portland
New London
Cape May
Norfolk
Kittyhawk
Cape Hatteras
Wilmington
Charleston
Savannah
Augusta
Atlanta
Jacksonville
Montgomery
Mobile
New Orleans
Galveston
Indianola
Punta Rassa
Key West
Havana
Nashville
Memphis
Shreveport
Vicksburg
Louisville
Cincinnati
Indianapolis
Pittsburgh
St Louis
Chicago
Davenport
La Crosse
St. Paul
Duluth
Escanaba
Detroit
Toledo
Cleveland
Buffalo
Rochester
Oswego
Toronto
Kingston
Montreal
Quebec
Halifax
Chatham
Father Pt
Rozier
Omaha
North Platte
Cheyenne
Denver
Pikes Peak
Santa Fe
Ft Gibson
Ft Sill
Denison
Leavenworth
Ft Sully
Bismarck
Virginia City
Salt Lake City
Ft Benton
Portland
San Francisco
San Diego
West 0 East
Long. West from 82 Greenwich
Brownsville
Santo Domingo

WAR DEPARTMENT WEATHER MAP.

SIGNAL SERVICE, U.S. ARMY.

DIVISION OF TELEGRAMS AND REPORTS FOR THE BENEFIT OF COMMERCE AND AGRICULTURE.

TRACKS OF CENTRES OF LOW BAROMETER FOR JUNE, 1876.

AVERAGE PROGRESS OF CENTRES OF LOW BAROMETER.

No.	Velocity.	
I	—	miles per hour.
II.	20	do.
III.	12.5	do.
IV.	—	do.
V.	—	do.
VI.	20	do.

Nos. I, IV and V were too indefinite to be properly located.

NOTE.—The Roman letters show number and order of areas of low barometer. The figures above the lines show the days of the month; those below, 1, 2 and 3, indicate respectively the 7:35 A. M., the 4:35 P. M., and 11 P. M. observations. The small circles on the lines indicate the position of the centre of the area of low barometer on the day and report, written respectively above and below the line.

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Albert J. Myer

BRIG. GEN. (BVT. ASSG'D) CHIEF SIGNAL OFFICER, U. S. A

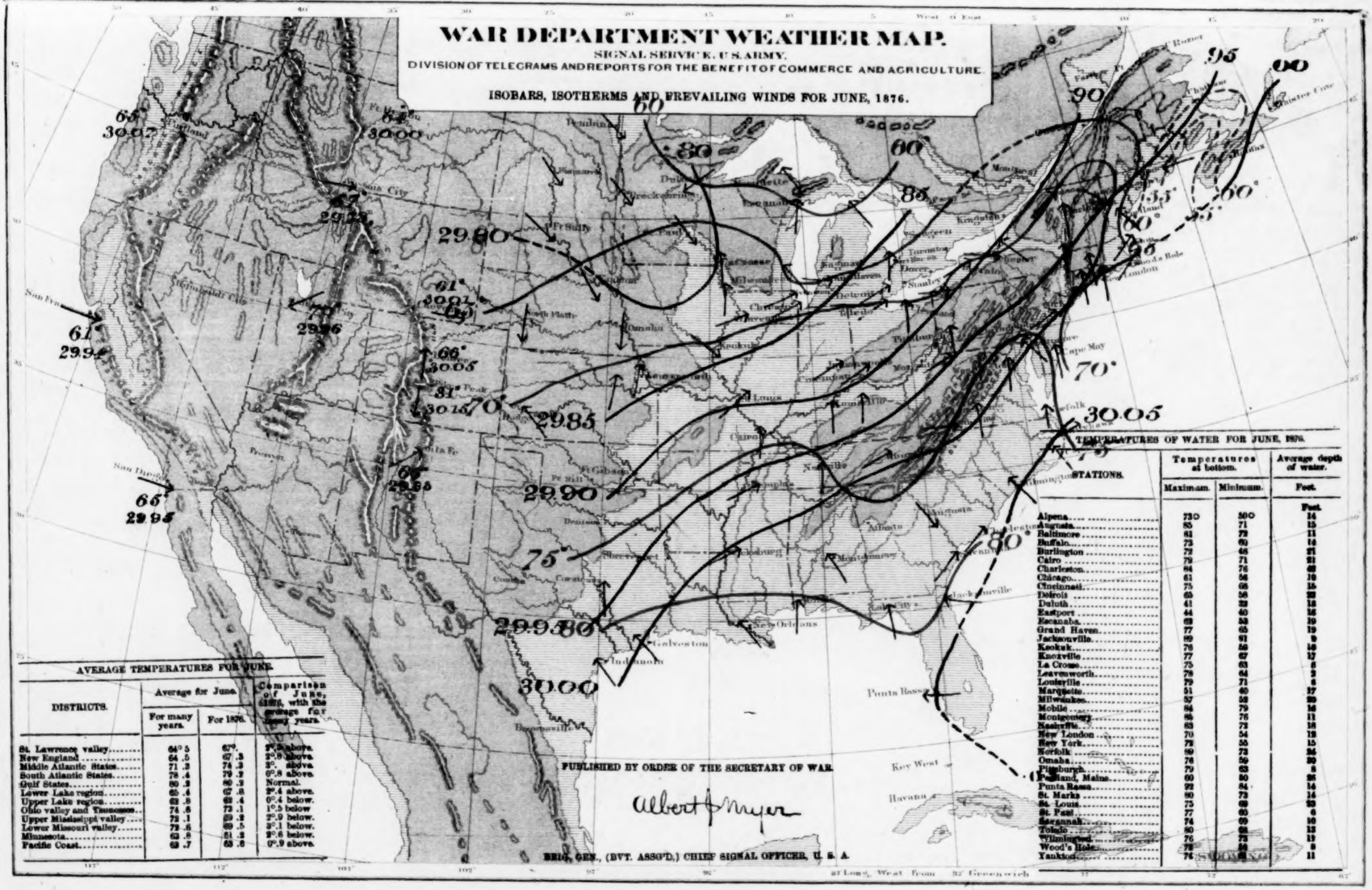
Nº 1

WAR DEPARTMENT WEATHER MAP.

SIGNAL SERVICE, U. S. ARMY.

DIVISION OF TELEGRAMS AND REPORTS FOR THE BENEFIT OF COMMERCE AND AGRICULTURE.

ISOBARS, ISOTHERMS AND PREVAILING WINDS FOR JUNE, 1876.


29.80
29.85
29.90
29.95
30.00
30.05
60
70°
75°
80°
85
90
95
Omaha
St. Louis
Chicago
New Orleans
Galveston
Punta Rassa
Key West
Havana
Cape May
Norfolk
Jacksonville
San Diego
Santa Fe
Long. West from Greenwich

DISTRICTS.	Average for June.		Comparison of June, 1876, with the average for many years.
	For many years.	For 1876.	
St. Lawrence valley	64° .5	67°.	2°.5 above.
New England	64 .5	67 .3	2°.8 above.
Middle Atlantic States	71 .3	74 .3	3°. above.
South Atlantic States	78 .4	79 .2	0°.8 above.
Gulf States	80 .3	80 .3	Normal.
Lower Lake region	65 .4	67 .8	2°.4 above.
Upper Lake region	62 .8	62 .4	0°.4 below.
Ohio valley and Tennessee	74 .6	73 .1	1°.5 below
Upper Mississippi valley	72 .1	69 .2	2°.9 below.
Lower Missouri valley	72 .6	69 .5	3°.1 below.
Minnesota	63 .8	61 .2	2°.6 below.
Pacific Coast	62 .7	63 .6	0°.9 above.

TEMPERATURES OF WATER FOR JUNE, 1876.

STATIONS.	Temperatures at bottom.		Average depth of water.
	Maximum.	Minimum.	Feet.
			Feet.
Alpena	73°	50°	14
Augusta	85	71	15
Baltimore	81	72	11
Buffalo	73	60	14
Burlington	72	46	21
Cairo	79	71	21
Charleston	84	76	48
Chicago	61	56	10
Cincinnati	75	68	15
Detroit	65	56	22
Duluth	41	33	13
Eastport	44	40	16
Escanaba	63	53	19
Grand Haven	77	65	19
Jacksonville	89	81	9
Keokuk	76	56	16
Knoxville	77	67	17
La Crosse	75	63	6
Leavenworth	78	64	3
Louisville	79	71	6
Marquette	51	40	37
Milwaukee	57	53	20
Mobile	84	79	16
Montgomery	86	76	11
Nashville	83	73	18
New London	70	54	13
New York	73	55	15
Norfolk	80	73	24
Omaha	76	59	20
Pittsburgh	79	63	8
Portland, Maine	60	50	26
Punta Rassa	92	84	16
St. Marks	90	73	14
St. Louis	75	68	23
St. Paul	77	60	6
Savannah	74	69	10
Toledo	80	68	13
Wilmington	76	75	13
Wood's Hole	73	56	9
Yankton	76	63	11

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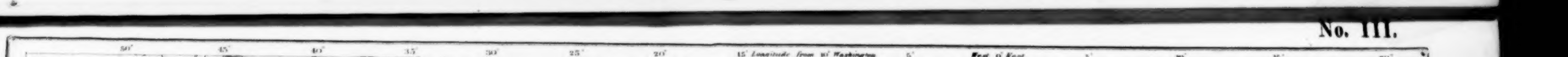
Albert J Myer

BRIG. GEN., (BVT. ASSG'D.) CHIEF SIGNAL OFFICER, U. S. A.

No. 111.

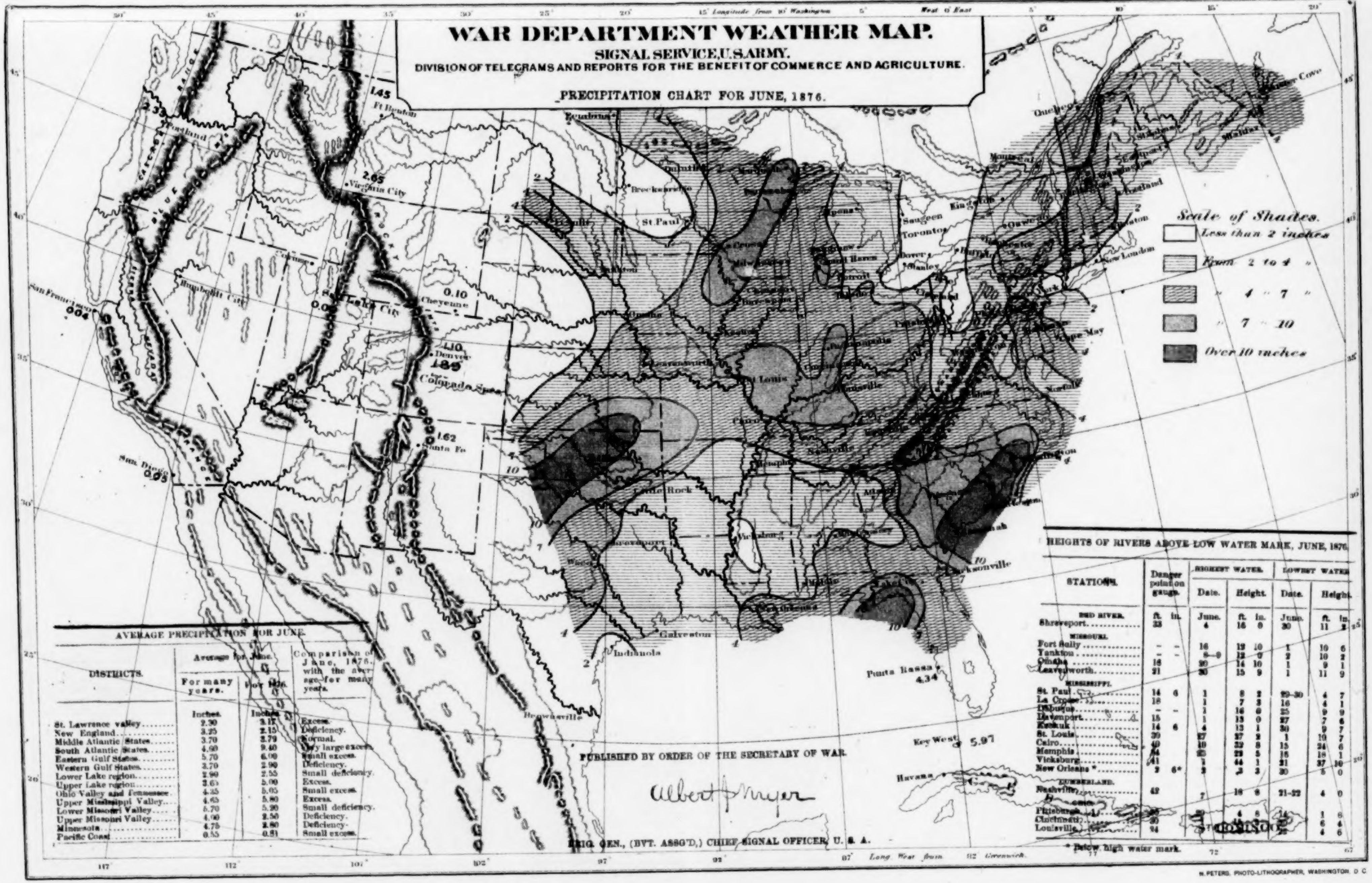

50'
45'
40'
35'
30'
25'
20'
15' Longitude from W. Washington
5'
West 0 East

WAR DEPARTMENT WEATHER MAP.

SIGNAL SERVICE, U.S. ARMY.

DIVISION OF TELEGRAMS AND REPORTS FOR THE BENEFIT OF COMMERCE AND AGRICULTURE.

PRECIPITATION CHART FOR JUNE, 1876.


Scale of Shades.
☐ Less than 2 inches
▨ From 2 to 4 "
▨ " 4 " 7 "
▨ " 7 " 10
■ Over 10 inches
15° Longitude from 10° Washington
West 0 East
Long West from Greenwich
1.45
2.65
Virginia City
St. Paul
0.10
Cheyenne
0.05
Salt Lake City
1.10
Denver
1.89
Colorado Springs
1.62
Santa Fe
San Francisco
0.04
San Diego
0.05
Little Rock
St. Louis
Galveston
Indianola
Brownsville
Punta Rassa
4.34
Key West
5.97
Havana
Cape May
New London
Toronto
Saugeen
Kingston
Quebec
Halifax
Jacksonville

AVERAGE PRECIPITATION FOR JUNE.			
DISTRICTS.	Average for June.		Comparison of June, 1876, with the average for many years.
	For many years.	For 1876.	
	Inches.	Inches.	
St. Lawrence valley	2.30	3.17	Excess.
New England	3.25	2.15	Deficiency.
Middle Atlantic States	3.70	3.79	Normal.
South Atlantic States	4.60	9.40	Very large excess.
Eastern Gulf States	5.70	6.00	Small excess.
Western Gulf States	3.70	2.90	Deficiency.
Lower Lake region	2.90	2.55	Small deficiency.
Upper Lake region	3.65	5.00	Excess.
Ohio Valley and Tennessee	4.35	5.05	Small excess.
Upper Mississippi Valley	4.65	5.80	Excess.
Lower Missouri Valley	5.70	5.20	Small deficiency.
Upper Missouri Valley	4.00	2.50	Deficiency.
Minnesota	4.75	2.80	Deficiency.
Pacific Coast	0.55	0.51	Small excess.

PUBLISHED BY ORDER OF THE SECRETARY OF WAR.

Albert J. Myer

BRIG. GEN., (BVT. ASSO'D,) CHIEF SIGNAL OFFICER, U. S. A.

HEIGHTS OF RIVERS ABOVE LOW WATER MARK, JUNE, 1876.								
STATIONS.	Danger point on gauge.		HIGHEST WATER.			LOWEST WATER.		
			Date.	Height.		Date.	Height.	
	ft.	in.	June.	ft.	in.	June.	ft.	in.
RED RIVER.								
Shreveport	33		4	16	9	30	11	2
MISSOURI.								
Fort Sully	–	–	16	12	10	1	10	6
Yankton	–	–	8–9	12	7	2	10	2
Omaha	16		20	14	10	1	9	1
Leavenworth	21		30	15	9	1	11	9
MISSISSIPPI.								
St. Paul	14	6	1	8	2	29–30	4	7
La Crosse	16		1	7	3	16	4	1
Dubuque	–	–	1	16	6	25	9	9
Davenport	15		1	13	0	27	7	6
Keokuk	14	6	4	13	1	30	9	7
St. Louis	30		17	27	2	1	10	7
Cairo	40		10	22	8	15	24	6
Memphis	34		23	23	5	18	18	1
Vicksburg	41		1	44	1	21	37	10
New Orleans *	2	6*	3	3	3	30	5	0
CUMBERLAND.								
Nashville	42		7	16	8	21–22	4	0
OHIO.								
Pittsburgh	26		20	4	5	14	1	8
Cincinnati	50		[illegible]	[illegible]	[illegible]	[illegible]	6	4
Louisville	24		[illegible]	[illegible]	[illegible]	[illegible]	4	6

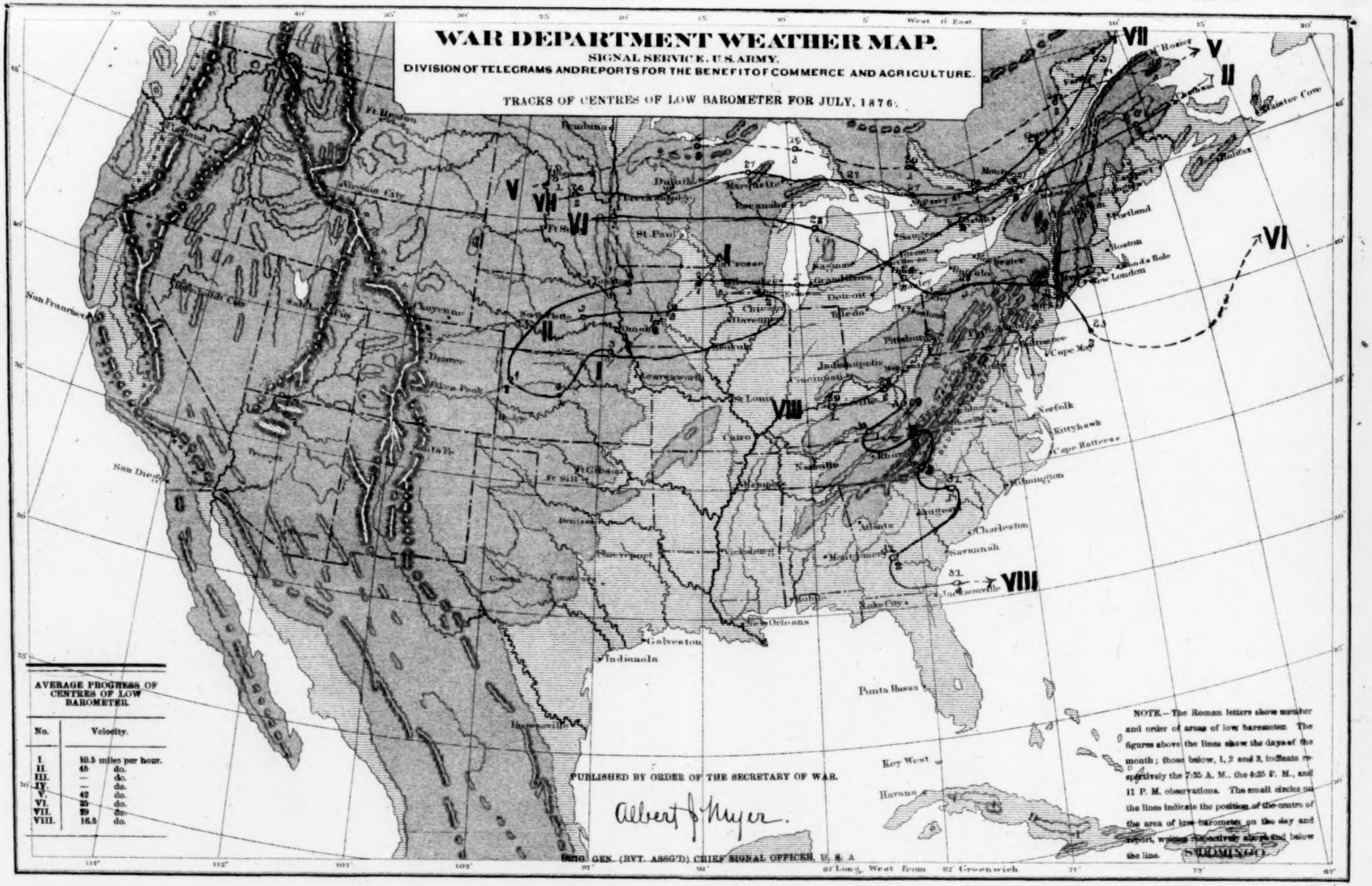
* Below high water mark.

H. PETERS, PHOTO-LITHOGRAPHER, WASHINGTON, D. C.

WAR DEPARTMENT WEATHER MAP.

SIGNAL SERVICE, U.S. ARMY,
DIVISION OF TELEGRAMS AND REPORTS FOR THE BENEFIT OF COMMERCE AND AGRICULTURE.

TRACKS OF CENTRES OF LOW BAROMETER FOR JULY, 1876.


West of East
Longitude West from Greenwich
I
II
V
VI
VII
VIII
Ft Benton
Virginia City
Salt Lake City
Cheyenne
Denver
Pikes Peak
Santa Fe
San Francisco
San Diego
Pembina
Duluth
Marquette
Escanaba
Breckenridge
St. Paul
La Crosse
Omaha
Chicago
Davenport
Keokuk
Leavenworth
St. Louis
Cairo
Indianapolis
Cincinnati
Louisville
Nashville
Knoxville
Memphis
Ft Gibson
Ft Sill
Denison
Shreveport
Vicksburg
Montgomery
Mobile
New Orleans
Galveston
Indianola
Brownsville
Detroit
Toledo
Cleveland
Pittsburg
Buffalo
Oswego
Rochester
Toronto
Saugeen
Alpena
Grand Haven
Milwaukee
Montreal
Quebec
Portland
Boston
Wood's Hole
New London
Cape May
Norfolk
Kittyhawk
Cape Hatteras
Wilmington
Charleston
Savannah
Augusta
Atlanta
Jacksonville
Cedar Keys
Punta Rassa
Key West
Havana
Halifax
Father Point
Cape Rozier
Chatham
Sydney
Cape Race
St. Domingo

AVERAGE PROGRESS OF CENTRES OF LOW BAROMETER.

No.	Velocity.
I.	10.5 miles per hour.
II.	45 do.
III.	— do.
IV.	— do.
V.	42 do.
VI.	25 do.
VII.	29 do.
VIII.	16.5 do.

NOTE.—The Roman letters show number and order of areas of low barometer. The figures above the lines show the days of the month; those below, 1, 2 and 3, indicate respectively the 7:35 A. M., the 4:35 P. M., and 11 P. M. observations. The small circles on the lines indicate the position of the centre of the area of low barometer on the day and report, written respectively above and below the line.

PUBLISHED BY ORDER OF THE SECRETARY OF WAR.

Albert J. Myer.

BRIG. GEN. (BVT. ASSG'D) CHIEF SIGNAL OFFICER, U. S. A.

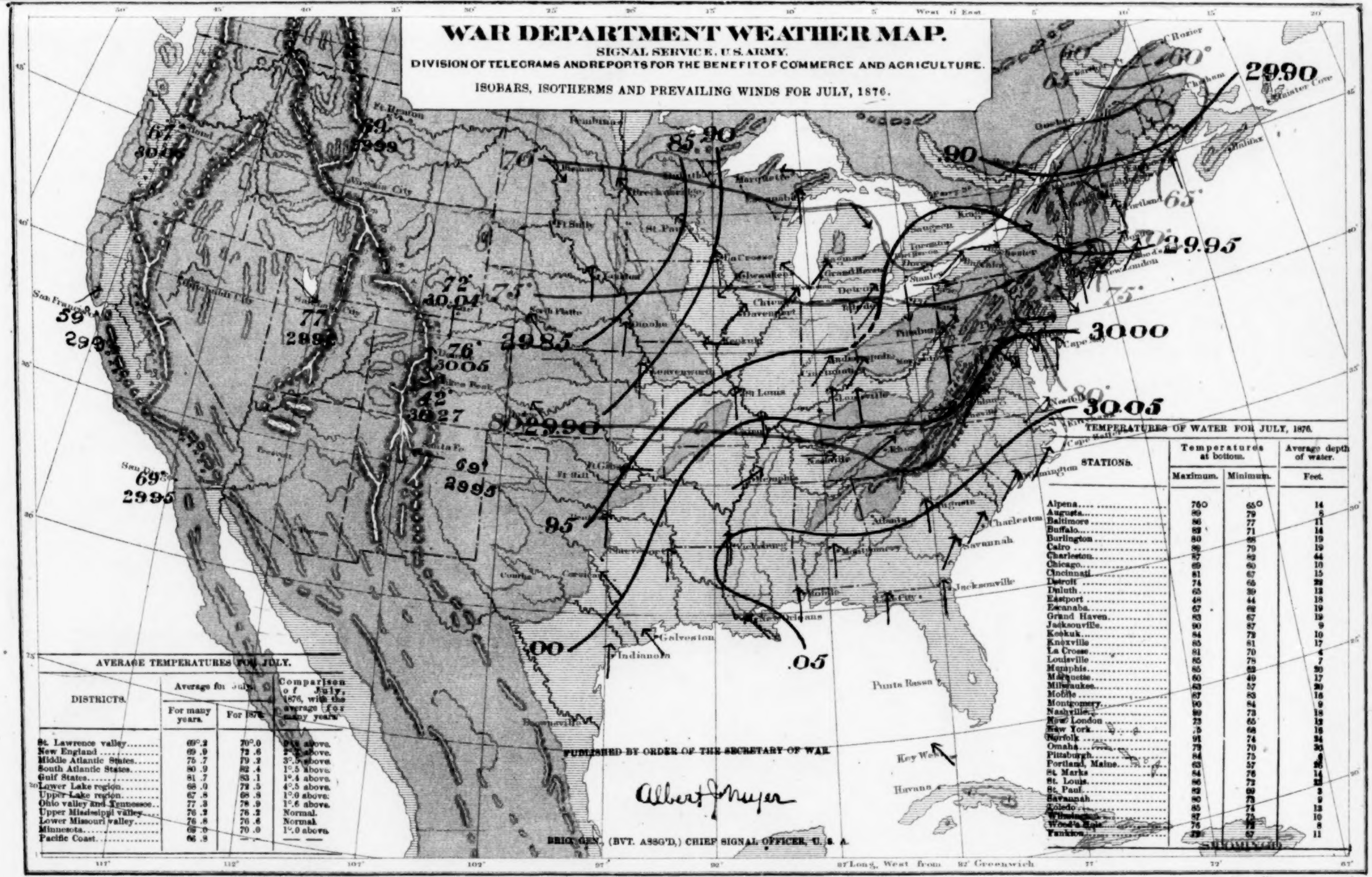
West 0 East

WAR DEPARTMENT WEATHER MAP.

SIGNAL SERVICE, U. S. ARMY.

DIVISION OF TELEGRAMS AND REPORTS FOR THE BENEFIT OF COMMERCE AND AGRICULTURE.

ISOBARS, ISOTHERMS AND PREVAILING WINDS FOR JULY, 1876.



PUBLISHED BY ORDER OF THE SECRETARY OF WAR.

Albert J. Myer

BRIG. GEN., (BVT. ASSG'D,) CHIEF SIGNAL OFFICER, U. S. A.

AVERAGE TEMPERATURES FOR JULY.

DISTRICTS.	Average for July.		Comparison of July, 1876, with the average for many years.
	For many years.	For 1876.	
St. Lawrence valley	69°.2	70°.0	0°.8 above.
New England	69 .9	72 .6	2°.7 above.
Middle Atlantic States	75 .7	79 .2	3°.5 above.
South Atlantic States	80 .9	82 .4	1°.5 above.
Gulf States	81 .7	83 .1	1°.4 above.
Lower Lake region	68 .0	72 .5	4°.5 above.
Upper Lake region	67 .8	68 .8	1°.0 above.
Ohio valley and Tennessee	77 .3	78 .9	1°.6 above.
Upper Mississippi valley	76 .2	76 .2	Normal.
Lower Missouri valley	76 .8	76 .6	Normal.
Minnesota	69 .0	70 .0	1°.0 above.
Pacific Coast	66 .3	—	— —

TEMPERATURES OF WATER FOR JULY, 1876.

STATIONS.	Temperatures at bottom.		Average depth of water.
	Maximum.	Minimum.	Feet.
Alpena	76°	65°	14
Augusta	89	79	5
Baltimore	86	77	11
Buffalo	82	71	14
Burlington	80	68	19
Cairo	86	79	19
Charleston	87	82	44
Chicago	69	60	10
Cincinnati	81	67	15
Detroit	74	65	22
Duluth	65	39	13
Eastport	48	44	18
Escanaba	67	62	19
Grand Haven	83	67	19
Jacksonville	90	87	9
Keokuk	84	73	10
Knoxville	85	81	17
La Crosse	81	70	4
Louisville	85	78	7
Memphis	85	82	20
Marquette	60	49	17
Milwaukee	63	57	20
Mobile	87	83	16
Montgomery	90	84	9
Nashville	90	73	18
New London	73	65	12
New York	75	68	16
Norfolk	91	74	24
Omaha	79	70	30
Pittsburgh	84	75	6
Portland, Maine	63	57	26
St. Marks	84	76	14
St. Louis	86	73	22
St. Paul	82	69	3
Savannah	80	73	9
Toledo	85	74	13
Wilmington	87	73	10
Wood's Hole	76	73	8
Yankton	79	67	11

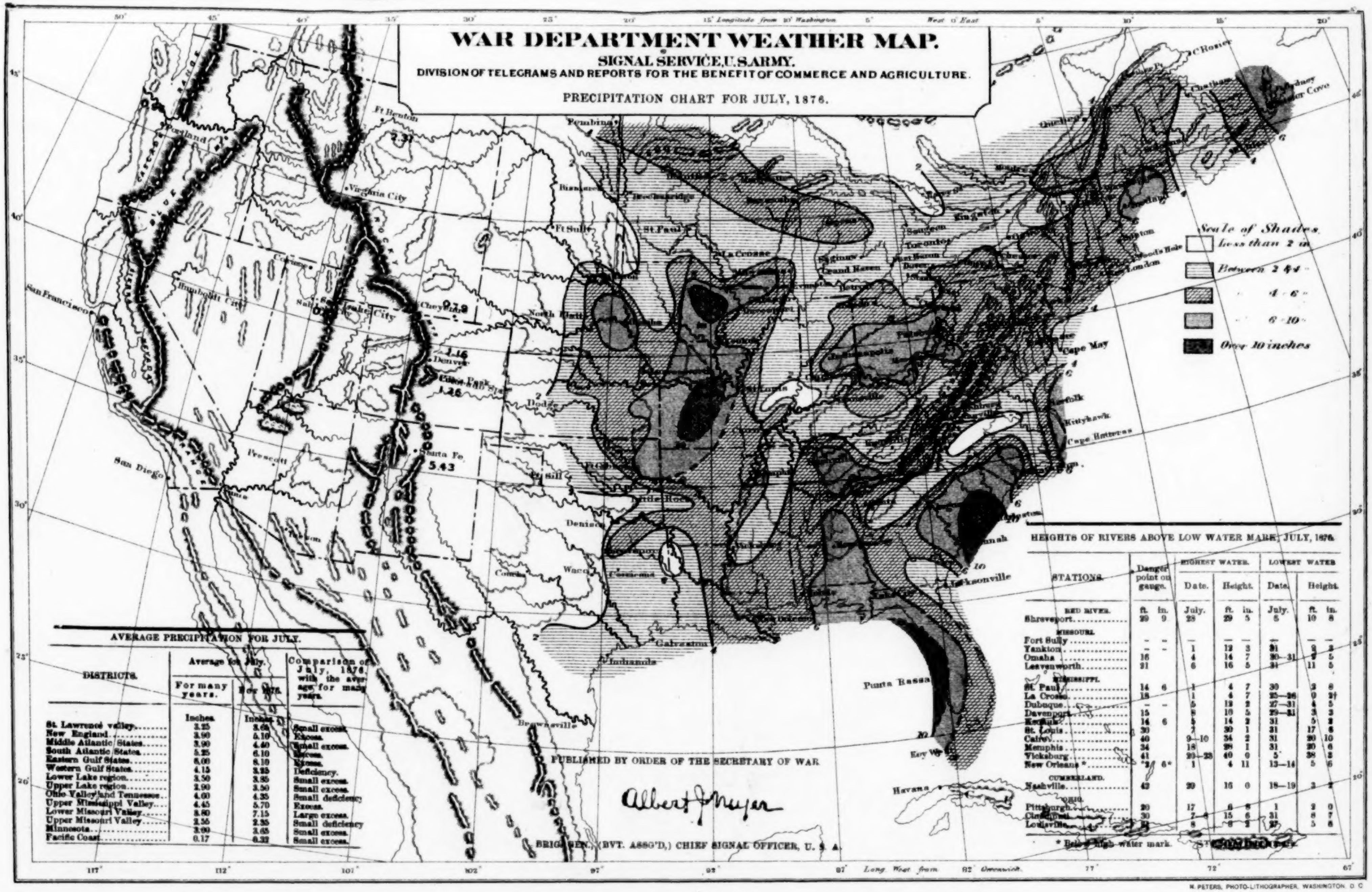
No. III.

WAR DEPARTMENT WEATHER MAP.

SIGNAL SERVICE, U.S. ARMY.

DIVISION OF TELEGRAMS AND REPORTS FOR THE BENEFIT OF COMMERCE AND AGRICULTURE.

PRECIPITATION CHART FOR JULY, 1876.


Scale of Shades.
less than 2 in
Between 2 & 4 "
" 4–6 "
" 6–10 "
Over 10 inches
Longitude from Washington
West
East
Long. West from Greenwich
Ft Benton
2.31
Portland
Virginia City
Ft Sully
Bismarck
Breckenridge
St. Paul
Pembina
La Crosse
Grand Haven
Toronto
Kingston
Quebec
C. Rosier
Chatham
Sydney
Father Cove
San Francisco
Humboldt City
Salt Lake City
Cheyenne
0.19
North Platte
Denver
1.16
Colorado Springs
Pike's Peak
1.26
Santa Fe
5.43
Dodge
Prescott
San Diego
Fort Sill
Denison
Waco
Concho
Galveston
Indianola
Brownsville
Little Rock
Shreveport
Vicksburg
New Orleans
Savannah
Jacksonville
Punta Rassa
Key West
Havana
Cape May
Norfolk
Kittyhawk
Cape Hatteras
Indianapolis
Pittsburgh
Boston
New London
Wood's Hole
Rocky
Blue
Cascade
Sierra Nevada

PUBLISHED BY ORDER OF THE SECRETARY OF WAR

Albert J. Myer

BRIG. GEN. (BVT. ASSG'D,) CHIEF SIGNAL OFFICER, U. S. A.

AVERAGE PRECIPITATION FOR JULY.

DISTRICTS.	Average for July.		Comparison of July, 1876, with the average for many years.
	For many years.	For 1876.	
	Inches.	Inches.	
St. Lawrence valley	3.25	3.68	Small excess.
New England	3.90	5.10	Excess.
Middle Atlantic States	3.90	4.40	Small excess.
South Atlantic States	5.25	6.10	Excess.
Eastern Gulf States	6.00	8.10	Excess.
Western Gulf States	4.15	3.25	Deficiency.
Lower Lake region	3.50	3.85	Small excess.
Upper Lake region	2.90	3.50	Small excess.
Ohio Valley and Tennessee	4.60	4.35	Small deficiency.
Upper Mississippi Valley	4.45	5.70	Excess.
Lower Missouri Valley	3.80	7.15	Large excess.
Upper Missouri Valley	2.56	2.35	Small deficiency.
Minnesota	3.00	3.65	Small excess.
Pacific Coast	0.17	0.32	Small excess.

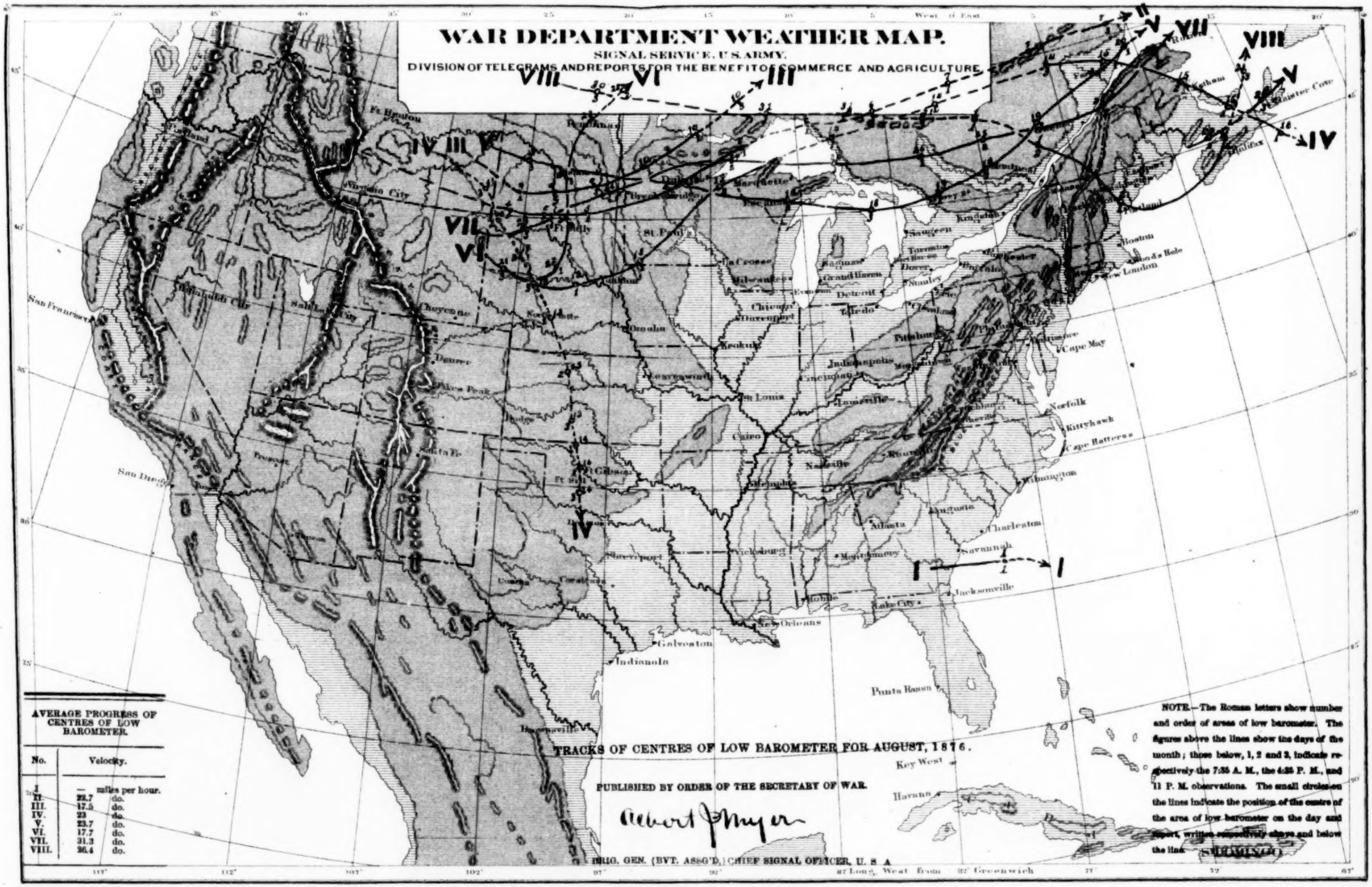
HEIGHTS OF RIVERS ABOVE LOW WATER MARK, JULY, 1876.

STATIONS.	Danger point on gauge.		HIGHEST WATER.			LOWEST WATER.		
			Date.	Height.		Date.	Height.	
	ft.	in.	July.	ft.	in.	July.	ft.	in.
RED RIVER.								
Shreveport	29	9	28	29	5	5	10	8
MISSOURI.								
Fort Sully	–	–	—	—	—	—	—	—
Yankton	–	–	1	12	3	31	2	2
Omaha	16		4	14	7	30—31	7	5
Leavenworth	21		6	16	5	31	11	5
MISSISSIPPI.								
St. Paul	14	6	1	4	7	30	2	8
La Crosse	18		1	4	7	25—26	0	2†
Dubuque	–	–	5	12	2	27—31	4	5
Davenport	15		8	10	5	29—31	3	3
Keokuk	14	6	5	14	2	31	5	2
St. Louis	30		7	30	1	31	17	8
Cairo	40		9—10	34	2	31	20	10
Memphis	34		18	28	1	31	20	6
Vicksburg	41		20—23	40	0	5	28	2
New Orleans *	*2	6*	1	4	11	13—14	5	6
CUMBERLAND.								
Nashville	42		20	16	0	18—19	2	2
OHIO.								
Pittsburgh	20		17	6	8	1	2	0
Cincinnati	30		7—8	15	6	31	8	7
Louisville	[illegible]		8	6	2	27	5	8

* Below high-water mark.

H. PETERS, PHOTO-LITHOGRAPHER, WASHINGTON, D. C.

No. I.


VIII
VI
III
II
V
VII
VIII
V
IV
IV III VIII
VII
VI
IV
I
I
Ft. Benton
Virginia City
St. Paul
La Crosse
Milwaukee
Chicago
Davenport
Keokuk
Omaha
Cheyenne
Salt Lake City
Denver
Pikes Peak
Santa Fe
Ft. Gibson
San Francisco
San Diego
Leavenworth
St. Louis
Cairo
Nashville
Memphis
Shreveport
Vicksburg
Montgomery
Mobile
New Orleans
Galveston
Indianola
Brownsville
Atlanta
Augusta
Charleston
Savannah
Jacksonville
Lake City
Wilmington
Cape Hatteras
Kittyhawk
Norfolk
Cape May
Indianapolis
Cincinnati
Louisville
Pittsburg
Toledo
Detroit
Cleveland
Buffalo
Toronto
Saugeen
Grand Haven
Escanaba
Marquette
Duluth
Kingston
Boston
Woods Hole
New London
Portland
Halifax
Punta Rassa
Key West
Havana
Cape Breton
West 0 East
87 Long. West from 82 Greenwich

WAR DEPARTMENT WEATHER MAP.

SIGNAL SERVICE, U.S. ARMY.

DIVISION OF TELEGRAMS AND REPORTS FOR THE BENEFIT OF COMMERCE AND AGRICULTURE.

TRACKS OF CENTRES OF LOW BAROMETER FOR AUGUST, 1876.

PUBLISHED BY ORDER OF THE SECRETARY OF WAR.

Albert J. Myer

BRIG. GEN. (BVT. ASSG'D.) CHIEF SIGNAL OFFICER, U. S. A.

AVERAGE PROGRESS OF CENTRES OF LOW BAROMETER.

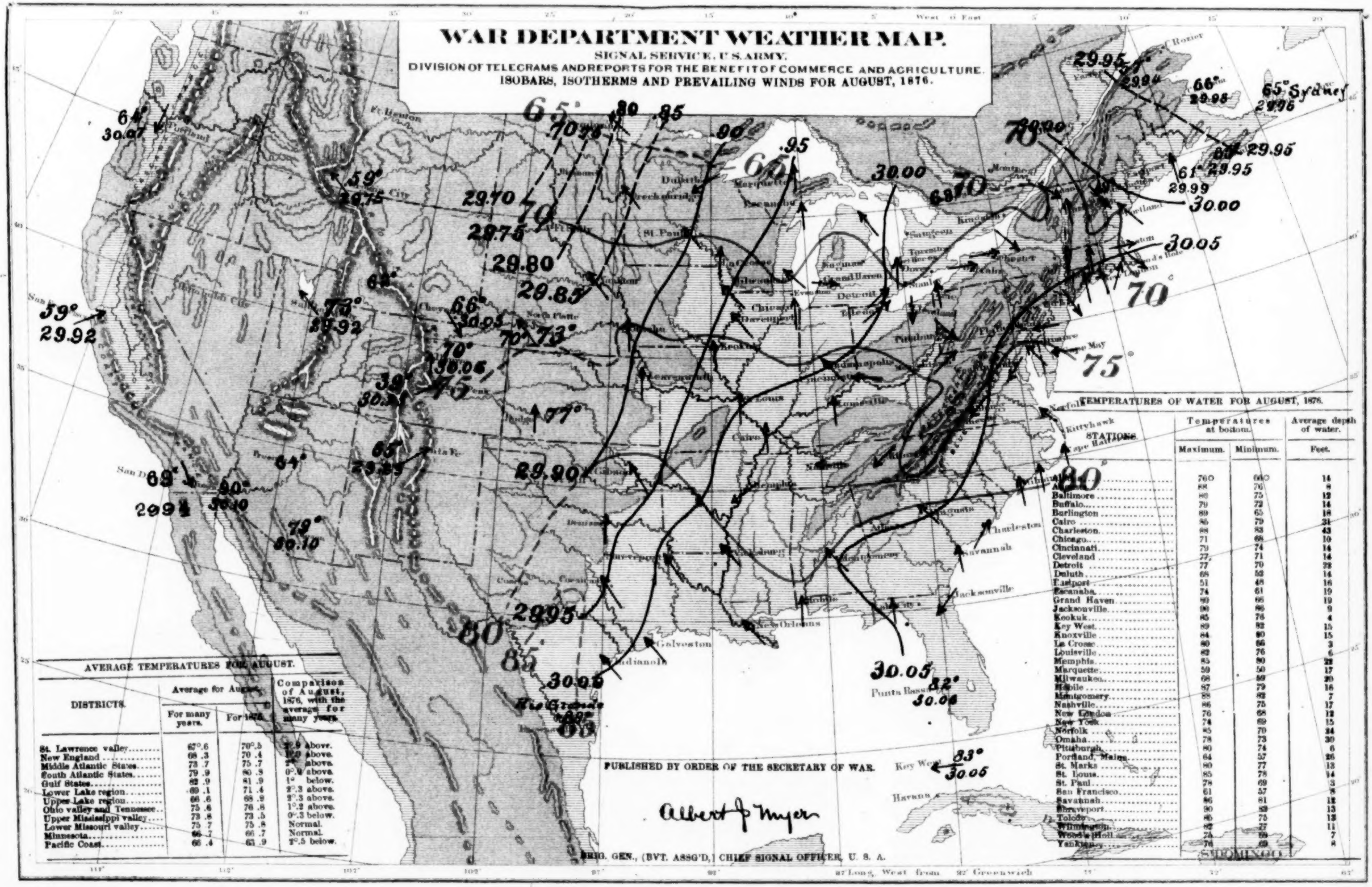
No.	Velocity.
I.	— miles per hour.
II.	22.7 do.
III.	17.5 do.
IV.	23 do.
V.	23.7 do.
VI.	17.7 do.
VII.	31.3 do.
VIII.	26.4 do.

NOTE.—The Roman letters show number and order of areas of low barometer. The figures above the lines show the days of the month; those below, 1, 2 and 3, indicate respectively the 7:35 A. M., the 4:35 P. M., and 11 P. M. observations. The small circles on the lines indicate the position of the centre of the area of low barometer on the day and report, written respectively above and below the line.

No. 11.

WAR DEPARTMENT WEATHER MAP.

SIGNAL SERVICE, U.S. ARMY.
DIVISION OF TELEGRAMS AND REPORTS FOR THE BENEFIT OF COMMERCE AND AGRICULTURE.
ISOBARS, ISOTHERMS AND PREVAILING WINDS FOR AUGUST, 1876.


65°
.70
.80
.85
.90
.95
65
64°
30.07
59°
29.75
29.70
70
29.75
29.80
29.85
30.00
68
70
70
30.00
29.95
29.94
66°
29.98
65° Sydney
29.96
29.95
61°
29.95
29.99
30.00
30.05
70°
75°
59°
29.92
73°
29.92
68°
66°
30.05
70°
73°
70°
30.06
39°
75
77°
65
29.85
64°
69°
90°
30.10
29.94
79°
30.10
29.90
80
29.95
80
85
30.05
Rio Grande
30.05
82°
30.06
83°
30.05

TEMPERATURES OF WATER FOR AUGUST, 1876.

STATIONS.	Temperatures at bottom.		Average depth of water.
	Maximum.	Minimum.	Feet.
[illegible]	76°	66°	14
[illegible]	88	76	8
Baltimore	80	75	12
Buffalo	79	72	14
Burlington	89	65	18
Cairo	86	79	21
Charleston	88	83	43
Chicago	71	68	10
Cincinnati	79	74	14
Cleveland	77	71	14
Detroit	77	70	22
Duluth	68	52	14
Eastport	51	48	16
Escanaba	74	61	19
Grand Haven	80	65	19
Jacksonville	90	86	9
Keokuk	85	76	4
Key West	89	82	15
Knoxville	84	80	15
La Crosse	80	66	3
Louisville	82	76	6
Memphis	85	80	22
Marquette	59	50	17
Milwaukee	68	59	20
Mobile	87	79	16
Montgomery	88	82	7
Nashville	86	75	17
New London	76	68	12
New York	74	69	15
Norfolk	85	70	24
Omaha	78	73	30
Pittsburgh	80	74	6
Portland, Maine	64	57	26
St. Marks	90	77	13
St. Louis	85	78	14
St. Paul	78	69	3
San Francisco	61	57	8
Savannah	86	81	12
Shreveport	90	89	13
Toledo	86	75	13
Wilmington	82	77	11
Wood's Holl	74	69	7
Yankton	76	69	8

AVERAGE TEMPERATURES FOR AUGUST.

DISTRICTS.	Average for August.		Comparison of August, 1876, with the average for many years.
	For many years.	For 1876.	
St. Lawrence valley	67°.6	70°.5	2°.9 above.
New England	68 .3	70 .4	[illegible] above.
Middle Atlantic States	73 .7	75 .7	2° above.
South Atlantic States	79 .9	80 .8	0°.9 above.
Gulf States	82 .9	81 .9	1° below.
Lower Lake region	69 .1	71 .4	2°.3 above.
Upper Lake region	66 .6	68 .9	2°.3 above.
Ohio valley and Tennessee	75 .6	76 .8	1°.2 above.
Upper Mississippi valley	73 .8	73 .5	0°.3 below.
Lower Missouri valley	75 .7	75 .8	Normal.
Minnesota	66 .7	66 .7	Normal.
Pacific Coast	66 .4	63 .9	2°.5 below.

PUBLISHED BY ORDER OF THE SECRETARY OF WAR.

Albert J. Myer

BRIG. GEN., (BVT. ASSG'D,) CHIEF SIGNAL OFFICER, U. S. A.

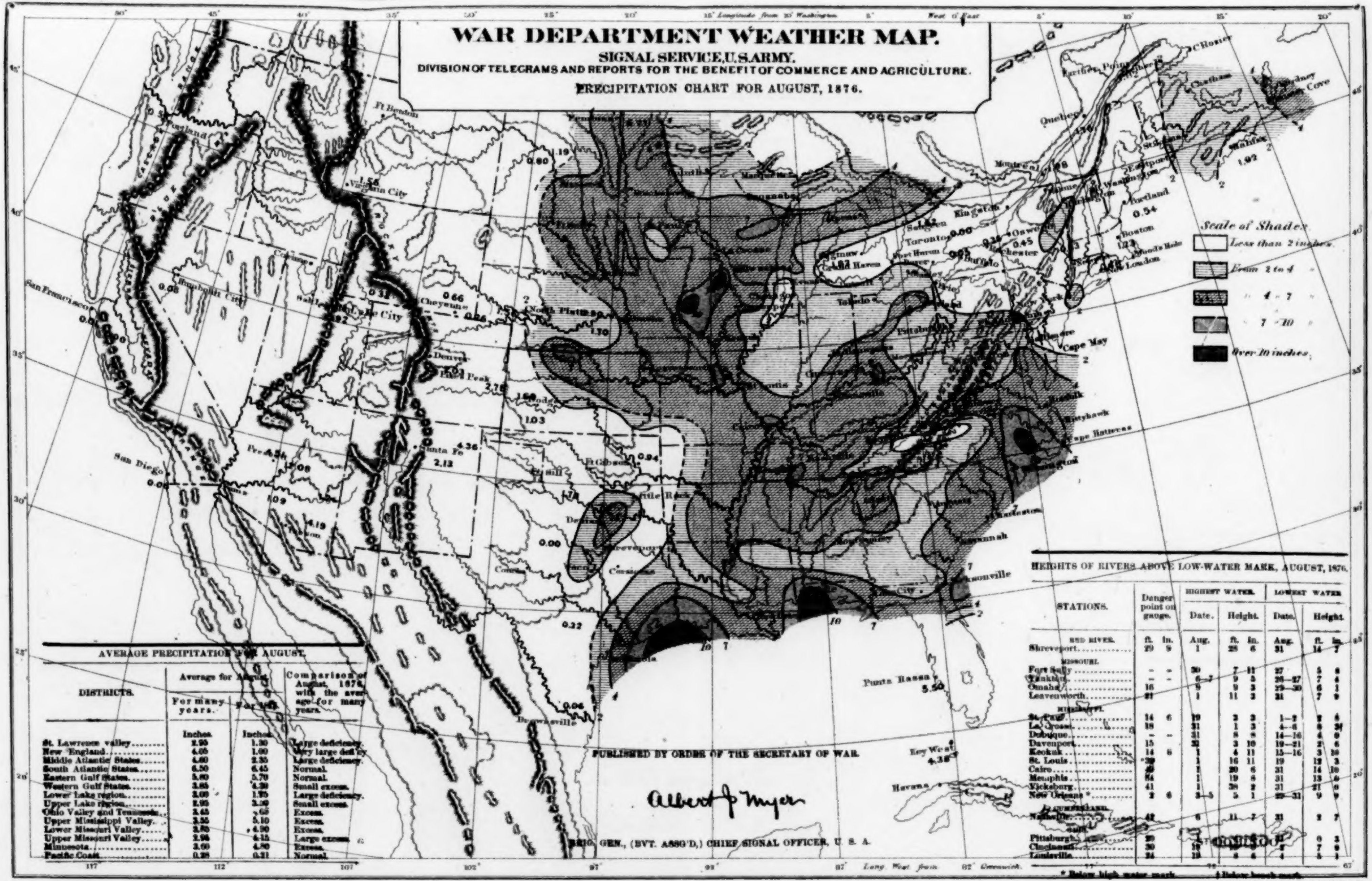
No. III.

15' Longitude from W Washington
East 0 East

WAR DEPARTMENT WEATHER MAP.

SIGNAL SERVICE, U.S. ARMY.
DIVISION OF TELEGRAMS AND REPORTS FOR THE BENEFIT OF COMMERCE AND AGRICULTURE.

PRECIPITATION CHART FOR AUGUST, 1876.


Scale of Shades.
Less than 2 inches.
From 2 to 4 "
" 4 - 7 "
" 7 - 10 "
Over 10 inches.
Longitude from Washington
West 0° East
Long. West from Greenwich.
San Francisco
San Diego
Ft Benton
Virginia City
Salt Lake City
Cheyenne
North Platte
Denver
Pikes Peak
Santa Fe
Dodge
Ft Gibson
Little Rock
Shreveport
Corsicana
Brownsville
Montreal
Quebec
Kingston
Toronto
Oswego
Rochester
Port Huron
Grand Haven
Toledo
Pittsburgh
Boston
Portland
New London
Cape May
Cape Hatteras
Kittyhawk
Charleston
Savannah
Jacksonville
Punta Rassa
Key West
Havana
Halifax
Sydney
Glace Bay

AVERAGE PRECIPITATION FOR AUGUST.

DISTRICTS.	Average for August. For many years.	Average for August. For 1876.	Comparison of August, 1876, with the average for many years.
	Inches.	Inches.	
St. Lawrence valley	2.95	1.30	Large deficiency.
New England	4.05	1.60	Very large def'cy.
Middle Atlantic States	4.60	2.35	Large deficiency.
South Atlantic States	6.50	6.45	Normal.
Eastern Gulf States	5.80	5.70	Normal.
Western Gulf States	3.85	4.30	Small excess.
Lower Lake region	3.00	1.95	Large deficiency.
Upper Lake region	2.95	3.30	Small excess.
Ohio Valley and Tennessee	3.45	4.65	Excess.
Upper Mississippi Valley	3.55	5.10	Excess.
Lower Missouri Valley	3.85	4.90	Excess.
Upper Missouri Valley	2.95	4.15	Large excess.
Minnesota	3.60	4.80	Excess.
Pacific Coast	0.28	0.21	Normal.

HEIGHTS OF RIVERS ABOVE LOW-WATER MARK, AUGUST, 1876.

STATIONS.	Danger point on gauge.		Highest water. Date.	Highest water. Height.		Lowest water. Date.	Lowest water. Height.	
	ft.	in.	Aug.	ft.	in.	Aug.	ft.	in.
RED RIVER.								
Shreveport	29	9	1	28	6	31	14	7
MISSOURI.								
Fort Sully	–	–	30	7	11	27	5	8
Yankton	–	–	6—7	9	5	26—27	7	4
Omaha	16		9	9	3	29—30	6	1
Leavenworth	21		1	11	3	31	7	9
MISSISSIPPI.								
St. Paul	14	6	19	2	3	1—2	2	6
La Crosse	18		31	1	3	4—6	0	3†
Dubuque	–	–	31	8	8	14—16	4	0
Davenport	15		31	3	10	19—21	2	6
Keokuk	14	6	1	4	11	15—16	3	10
St. Louis	*30		1	16	11	19	12	3
Cairo	40		1	20	6	31	14	10
Memphis	34		1	19	8	31	13	0
Vicksburg	41		1	38	2	31	21	0
New Orleans *	2	6	3—5	5	1	29—31	9	9
CUMBERLAND.								
Nashville	42		6	11	7	31	2	7
OHIO.								
Pittsburgh	20		[illegible]	[illegible]	[illegible]	31	0	3
Cincinnati	30		19	[illegible]	[illegible]	2	7	9
Louisville	24		19	8	6	4	5	1

* Below high water mark. † Below bench mark.

PUBLISHED BY ORDER OF THE SECRETARY OF WAR.

Albert J. Myer

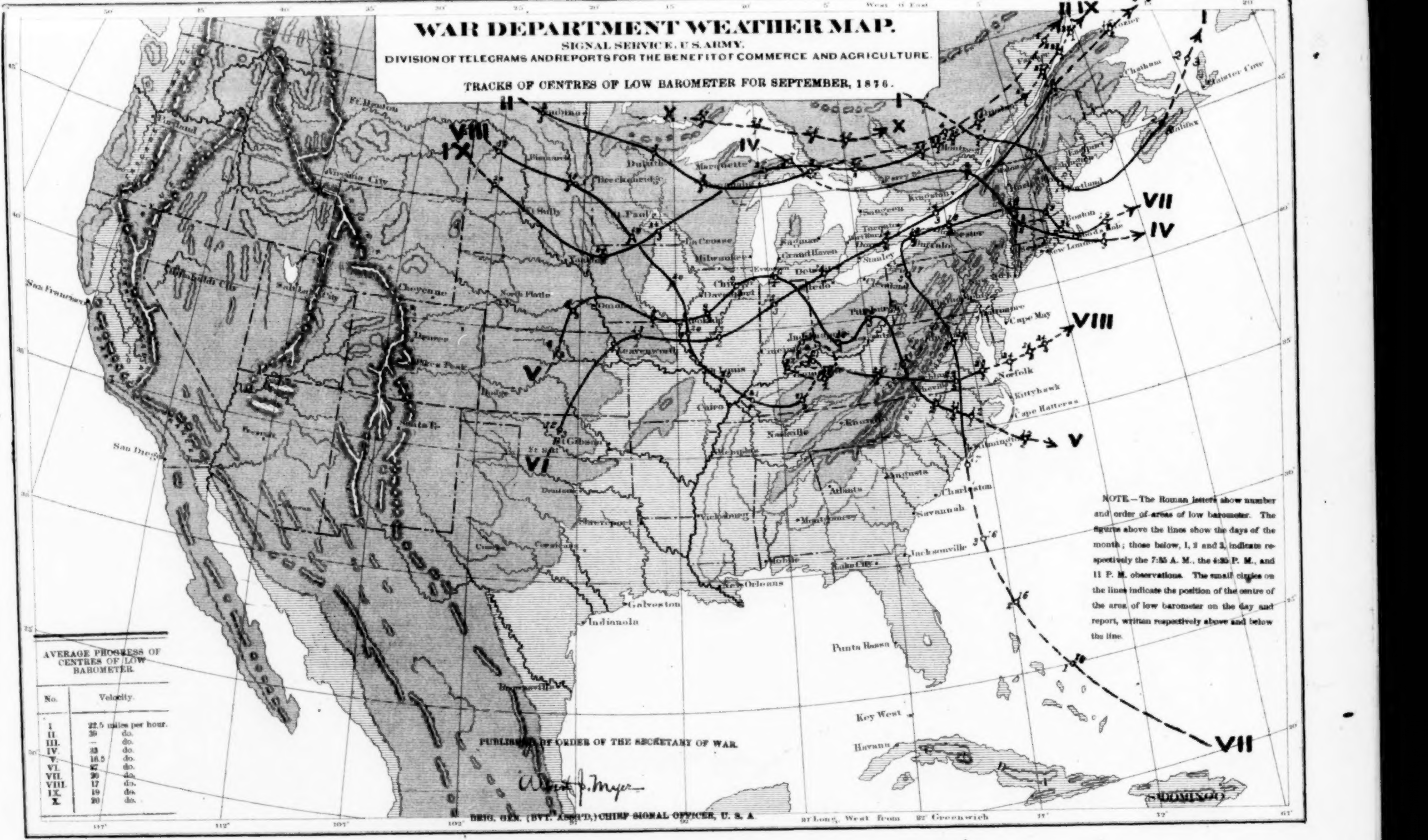
BRIG. GEN., (BVT. ASSG'D,) CHIEF SIGNAL OFFICER, U. S. A.

H. PETERS, PHOTO-LITHOGRAPHER, WASHINGTON, D. C.

WAR DEPARTMENT WEATHER MAP.

SIGNAL SERVICE, U.S. ARMY.
DIVISION OF TELEGRAMS AND REPORTS FOR THE BENEFIT OF COMMERCE AND AGRICULTURE.

TRACKS OF CENTRES OF LOW BAROMETER FOR SEPTEMBER, 1876.



I
II
III
IV
V
VI
VII
VIII
IX
X
Ft. Benton
Portland
Virginia City
Salt Lake City
Cheyenne
North Platte
Denver
Pikes Peak
Santa Fe
Bismarck
Breckenridge
Duluth
Marquette
St. Paul
Yankton
La Crosse
Milwaukee
Grand Haven
Chicago
Davenport
Omaha
Leavenworth
St. Louis
Cairo
Nashville
Memphis
Ft. Gibson
Ft. Sill
Denison
Shreveport
Vicksburg
Montgomery
Mobile
New Orleans
Galveston
Indianola
Brownsville
San Francisco
San Diego
Kingston
Montreal
Quebec
Eastport
Portland
Boston
Wood's Hole
New London
Buffalo
Toronto
Detroit
Toledo
Cleveland
Pittsburgh
Indianapolis
Cincinnati
Knoxville
Augusta
Atlanta
Charleston
Savannah
Jacksonville
Lake City
Punta Rassa
Key West
Havana
Cape May
Norfolk
Kittyhawk
Cape Hatteras
Wilmington
Chatham
Halifax
Sydney
Cape Breton
S. DOMINGO
West 0 East
Long. West from Greenwich

NOTE.—The Roman letters show number and order of areas of low barometer. The figures above the lines show the days of the month; those below, 1, 2 and 3, indicate respectively the 7:35 A. M., the 4:35 P. M., and 11 P. M. observations. The small circles on the lines indicate the position of the centre of the area of low barometer on the day and report, written respectively above and below the line.

AVERAGE PROGRESS OF CENTRES OF LOW BAROMETER.

No.	Velocity.
I.	22.5 miles per hour.
II.	39 do.
III.	— do.
IV.	33 do.
V.	16.5 do.
VI.	27 do.
VII.	20 do.
VIII.	17 do.
IX.	19 do.
X.	20 do.

PUBLISHED BY ORDER OF THE SECRETARY OF WAR.

Albert J. Myer

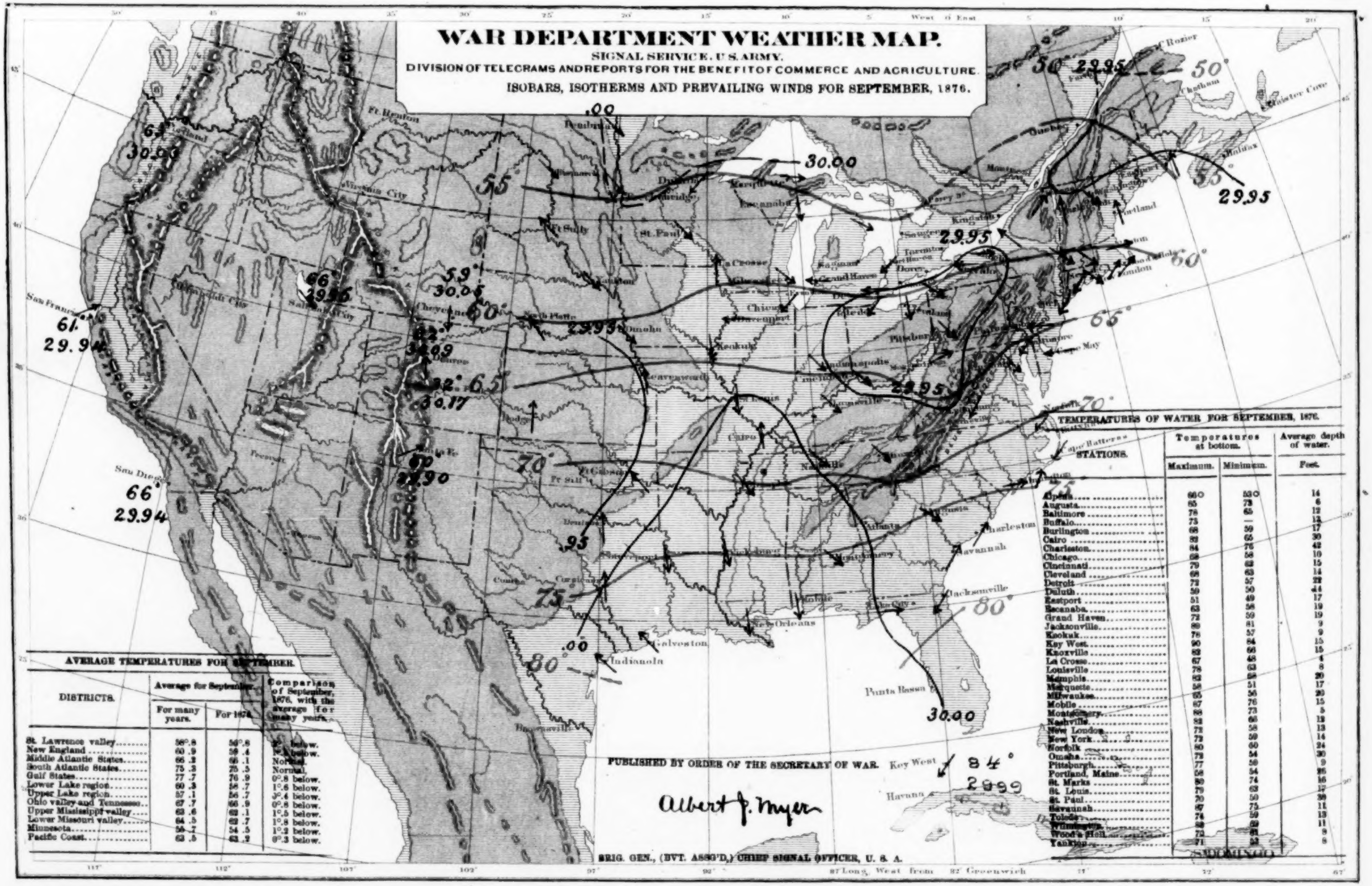
BRIG. GEN. (BVT. ASSG'D,) CHIEF SIGNAL OFFICER, U. S. A.

No. 11.

20
15
10
5
West 0 East
5
10
15
20
25
30
35
40
45
50

WAR DEPARTMENT WEATHER MAP.

SIGNAL SERVICE, U.S. ARMY.
DIVISION OF TELEGRAMS AND REPORTS FOR THE BENEFIT OF COMMERCE AND AGRICULTURE.
ISOBARS, ISOTHERMS AND PREVAILING WINDS FOR SEPTEMBER, 1876.


30.00
29.95
29.95
29.95
29.95
30.00
50°
55°
60°
65°
70°
75°
80°
.00
.00
.95
63°
30.03
61°
29.94
66°
29.94
66°
29.96
59°
30.05
62°
30.09
62°
30.17
60°
29.90
84°
29.99
Key West
Havana
Punta Rassa
Jacksonville
Savannah
Charleston
Cape Hatteras
Cape May
New Orleans
Galveston
Indianola
San Francisco
San Diego
Salt Lake City
Virginia City
Cheyenne
North Platte
Omaha
St. Paul
Duluth
Chicago
Keokuk
Pittsburgh
Quebec
Halifax
Chatham
Ft. Benton
Ft. Sully
West 0 East
87° Long. West from 82° Greenwich

AVERAGE TEMPERATURES FOR SEPTEMBER.			
DISTRICTS.	Average for September.		Comparison of September, 1876, with the average for many years.
	For many years.	For 1876.	
St. Lawrence valley	58°.8	56°.8	2° below.
New England	60 .9	59 .4	1°.5 below.
Middle Atlantic States	66 .2	66 .1	Normal.
South Atlantic States	75 .3	75 .5	Normal.
Gulf States	77 .7	76 .9	0°.8 below.
Lower Lake region	60 .3	58 .7	1°.6 below.
Upper Lake region	57 .1	53 .7	3°.4 below.
Ohio valley and Tennessee	67 .7	66 .9	0°.8 below.
Upper Mississippi valley	63 .6	62 .1	1°.5 below.
Lower Missouri valley	64 .5	62 .7	1°.8 below.
Minnesota	55 .7	54 .5	1°.2 below.
Pacific Coast	63 .5	63 .2	0°.3 below.

TEMPERATURES OF WATER FOR SEPTEMBER, 1876.			
STATIONS.	Temperatures at bottom.		Average depth of water.
	Maximum.	Minimum.	Feet.
Alpena	66°	53°	14
Augusta	85	73	6
Baltimore	78	65	12
Buffalo	73	—	12
Burlington	68	59	17
Cairo	82	65	30
Charleston	84	76	42
Chicago	68	56	10
Cincinnati	79	62	15
Cleveland	68	63	14
Detroit	73	57	22
Duluth	59	50	44
Eastport	51	49	17
Escanaba	63	56	19
Grand Haven	72	59	19
Jacksonville	89	81	9
Keokuk	76	57	9
Key West	90	84	15
Knoxville	82	66	15
La Crosse	67	48	4
Louisville	76	63	8
Memphis	82	68	20
Marquette	58	51	17
Milwaukee	65	56	20
Mobile	87	76	15
Montgomery	88	73	5
Nashville	82	66	13
New London	72	58	13
New York	73	59	14
Norfolk	80	60	24
Omaha	73	54	20
Pittsburgh	77	59	9
Portland, Maine	58	54	25
St. Marks	80	74	16
St. Louis	79	63	17
St. Paul	70	50	30
Savannah	87	75	11
Toledo	74	59	13
Wilmington	80	69	11
Wood's Holl	72	61	8
Yankton	71	53	8

PUBLISHED BY ORDER OF THE SECRETARY OF WAR.

Albert J. Myer

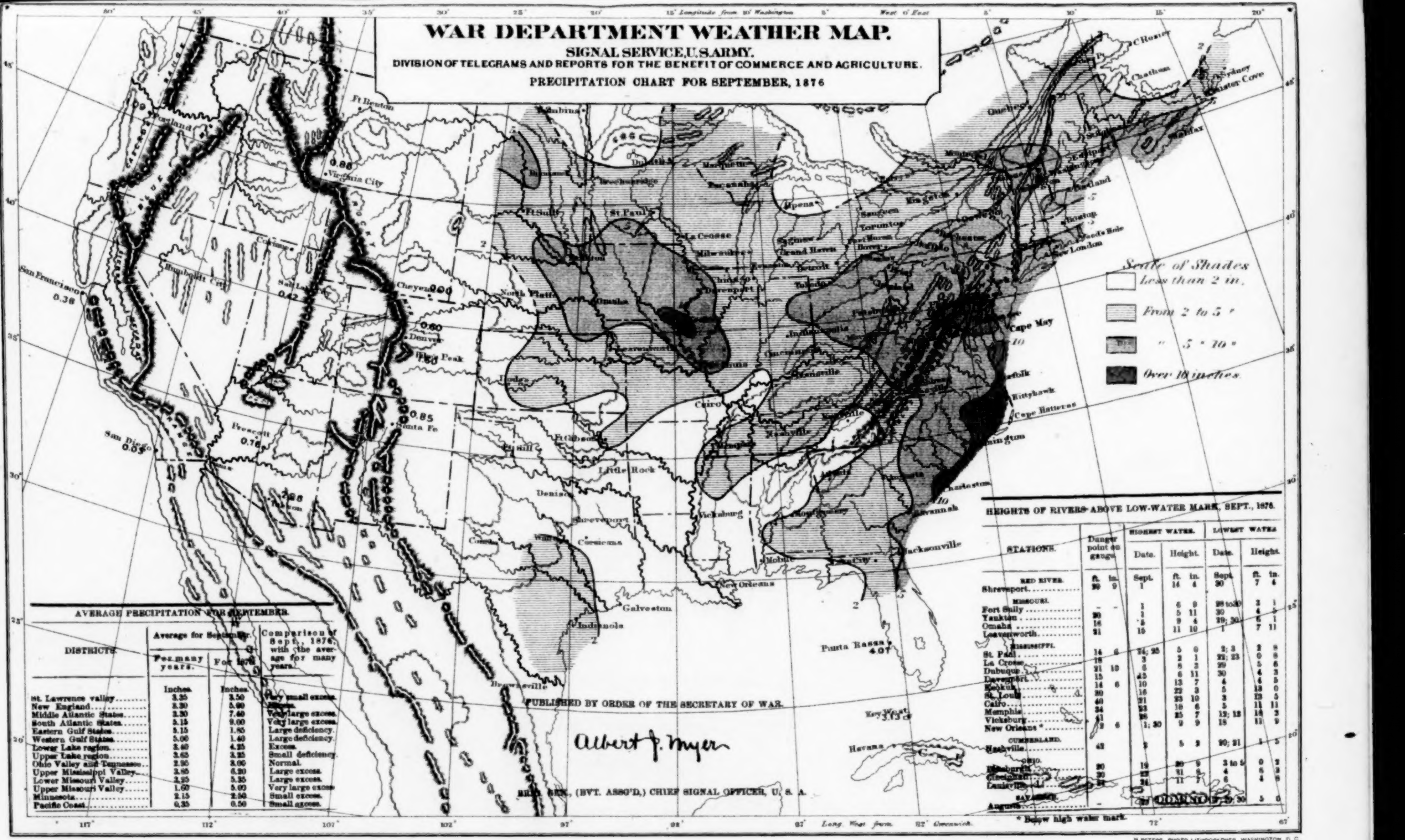
BRIG. GEN., (BVT. ASSG'D,) CHIEF SIGNAL OFFICER, U. S. A.

WAR DEPARTMENT WEATHER MAP.

SIGNAL SERVICE, U.S. ARMY.

DIVISION OF TELEGRAMS AND REPORTS FOR THE BENEFIT OF COMMERCE AND AGRICULTURE.

PRECIPITATION CHART FOR SEPTEMBER, 1876


15° Longitude from W. Washington
West 0 East
Scale of Shades
Less than 2 in.
From 2 to 5 "
" 5 " 10 "
Over 10 inches.
Ft Benton
Virginia City
0.86
Corinne
Salt Lake
0.42
Humboldt City
San Francisco
0.38
Portland
Cheyenne
0.00
Denver
0.60
Pike's Peak
1.60
Santa Fe
0.85
Prescott
0.76
San Diego
0.05
Yuma
Pembina
Duluth
Breckenridge
Ft Sully
St Paul
La Crosse
Milwaukee
North Platte
Omaha
Leavenworth
Dodge
Ft Gibson
Ft Sill
Little Rock
Denison
Shreveport
Corsicana
Galveston
Indianola
Brownsville
Vicksburg
New Orleans
Mobile
Cairo
Nashville
Marquette
Escanaba
Alpena
Saugeen
Toronto
Kingston
Detroit
Toledo
Grand Haven
Port Huron
Davenport
Indianapolis
Cincinnati
Evansville
Pittsburgh
Montgomery
Jacksonville
Savannah
Charleston
Wilmington
Cape Hatteras
Kittyhawk
Norfolk
Cape May
Boston
New London
Wood's Hole
Portland
Eastport
Quebec
Montreal
Chatham
C. Rosier
Sydney
Halifax
Glace Bay Cove
Punta Rassa
4.07
Key West
3.13
Havana
Long. West from 82° Greenwich
117°
112°
107°
102°
97°
92°
87°
72°
67°
45°
40°
35°
30°
25°
20°

AVERAGE PRECIPITATION FOR SEPTEMBER.

DISTRICTS.	Average for September.		Comparison of Sept., 1876, with the average for many years.
	For many years.	For 1876.	
	Inches.	Inches.	
St. Lawrence valley	3.25	3.50	Very small excess.
New England	3.30	5.60	Excess.
Middle Atlantic States	3.30	7.40	Very large excess.
South Atlantic States	5.15	9.00	Very large excess.
Eastern Gulf States	5.15	1.85	Large deficiency.
Western Gulf States	5.00	1.40	Large deficiency.
Lower Lake region	3.40	4.25	Excess.
Upper Lake region	3.65	3.25	Small deficiency.
Ohio Valley and Tennessee	2.95	3.00	Normal.
Upper Mississippi Valley	2.85	6.20	Large excess.
Lower Missouri Valley	2.25	5.35	Large excess.
Upper Missouri Valley	1.60	5.00	Very large excess.
Minnesota	2.15	2.50	Small excess.
Pacific Coast	0.35	0.50	Small excess.

HEIGHTS OF RIVERS ABOVE LOW-WATER MARK, SEPT., 1876.

STATIONS.	Danger point on gauge.		HIGHEST WATER.			LOWEST WATER.		
			Date.	Height.		Date.	Height.	
	ft.	in.	Sept.	ft.	in.	Sept.	ft.	in.
RED RIVER.								
Shreveport	30	9	1	14	4	30	7	4
MISSOURI.								
Fort Sully	–	–	1	6	9	28 to 30	3	1
Yankton	20		1	5	11	30	4	5
Omaha	16		5	9	4	29; 30	6	1
Leavenworth	21		15	11	10	1	7	11
MISSISSIPPI.								
St. Paul	14	6	24; 25	5	0	2; 3	2	9
La Crosse	16		3	2	1	22; 23	0	8
Dubuque	21	10	6	8	2	29	5	6
Davenport	15		45	6	11	30	4	3
Keokuk	14	6	10	13	7	4	4	5
St. Louis	30		16	22	3	5	13	0
Cairo	40		21	23	10	3	12	5
Memphis	34		23	16	6	5	11	11
Vicksburg	41		25	25	7	12; 13	16	2
New Orleans *	2	6	1; 30	9	9	18	11	9
CUMBERLAND.								
Nashville	42		3	5	3	20; 21	1	5
OHIO.								
Pittsburgh	20		19	20	5	3 to 5	0	2
Cincinnati	30		27	31	5	4	6	2
Louisville	24		24	11	7	6	4	8
SAVANNAH.								
Augusta	–		27	[illegible]	[illegible]	29; 30	5	0

* Below high water mark.

PUBLISHED BY ORDER OF THE SECRETARY OF WAR.

Albert J. Myer

BRIG. GEN., (BVT. ASSO'D,) CHIEF SIGNAL OFFICER, U. S. A.

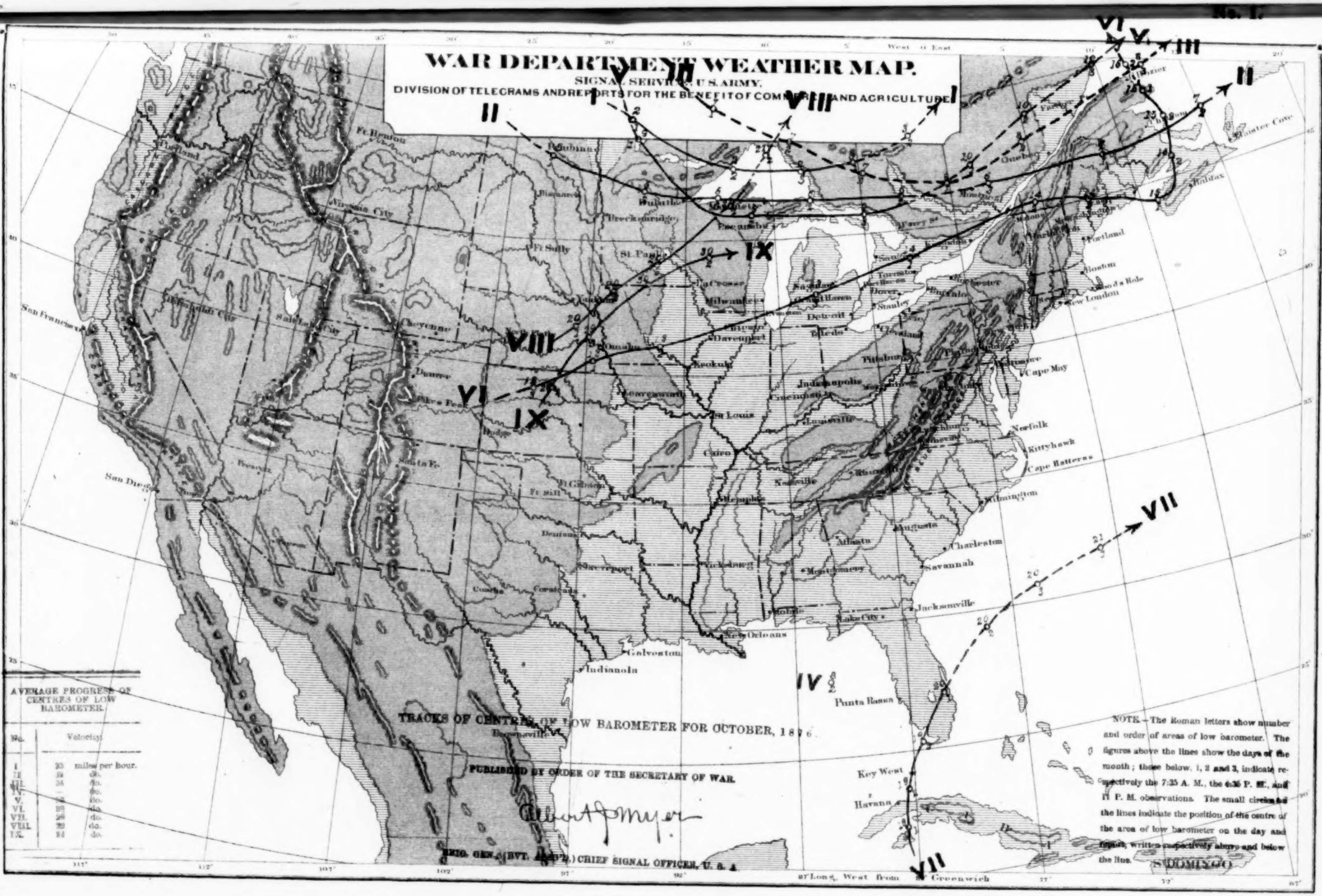
H. PETERS, PHOTO-LITHOGRAPHER, WASHINGTON, D. C.

West 0 East

WAR DEPARTMENT WEATHER MAP.

SIGNAL SERVICE, U.S. ARMY.

DIVISION OF TELEGRAMS AND REPORTS FOR THE BENEFIT OF COMMERCE AND AGRICULTURE.


I
II
III
IV
V
VI
VII
VIII
IX
West 0 East
Ft. Benton
Pembina
Bismarck
Duluth
Breckenridge
Ft. Sully
St. Paul
La Crosse
Milwaukee
Escanaba
Marquette
Virginia City
Salt Lake City
Cheyenne
Denver
Pike's Peak
Omaha
Yankton
Davenport
Keokuk
Leavenworth
St. Louis
Cairo
Santa Fe
Dodge
Ft. Gibson
Ft. Sill
Denison
Shreveport
Corsicana
Vicksburg
Memphis
Nashville
Louisville
Cincinnati
Indianapolis
Chicago
Detroit
Toledo
Cleveland
Pittsburg
Buffalo
Rochester
Toronto
Saugeen
Port Huron
Stanley
Montreal
Quebec
Portland
Boston
New London
Baltimore
Cape May
Norfolk
Kittyhawk
Cape Hatteras
Wilmington
Charleston
Savannah
Augusta
Atlanta
Montgomery
Mobile
Jacksonville
Cedar Keys
New Orleans
Galveston
Indianola
Brownsville
Punta Rassa
Key West
Havanna
Halifax
Chatham
Portland
San Francisco
San Diego
Prescott
S. DOMINGO
Long. West from Greenwich
102°
97°
92°
87°
77°
72°
67°
112°
117°

TRACKS OF CENTRES OF LOW BAROMETER FOR OCTOBER, 1876.

PUBLISHED BY ORDER OF THE SECRETARY OF WAR.

Albert J. Myer

BRIG. GEN. (BVT. ASS'T,) CHIEF SIGNAL OFFICER, U. S. A.

NOTE.—The Roman letters show number and order of areas of low barometer. The figures above the lines show the days of the month; those below, 1, 2 and 3, indicate respectively the 7:35 A. M., the 4:35 P. M., and 11 P. M. observations. The small circles on the lines indicate the position of the centre of the area of low barometer on the day and hour, written respectively above and below the line.

AVERAGE PROGRESS OF CENTRES OF LOW BAROMETER.

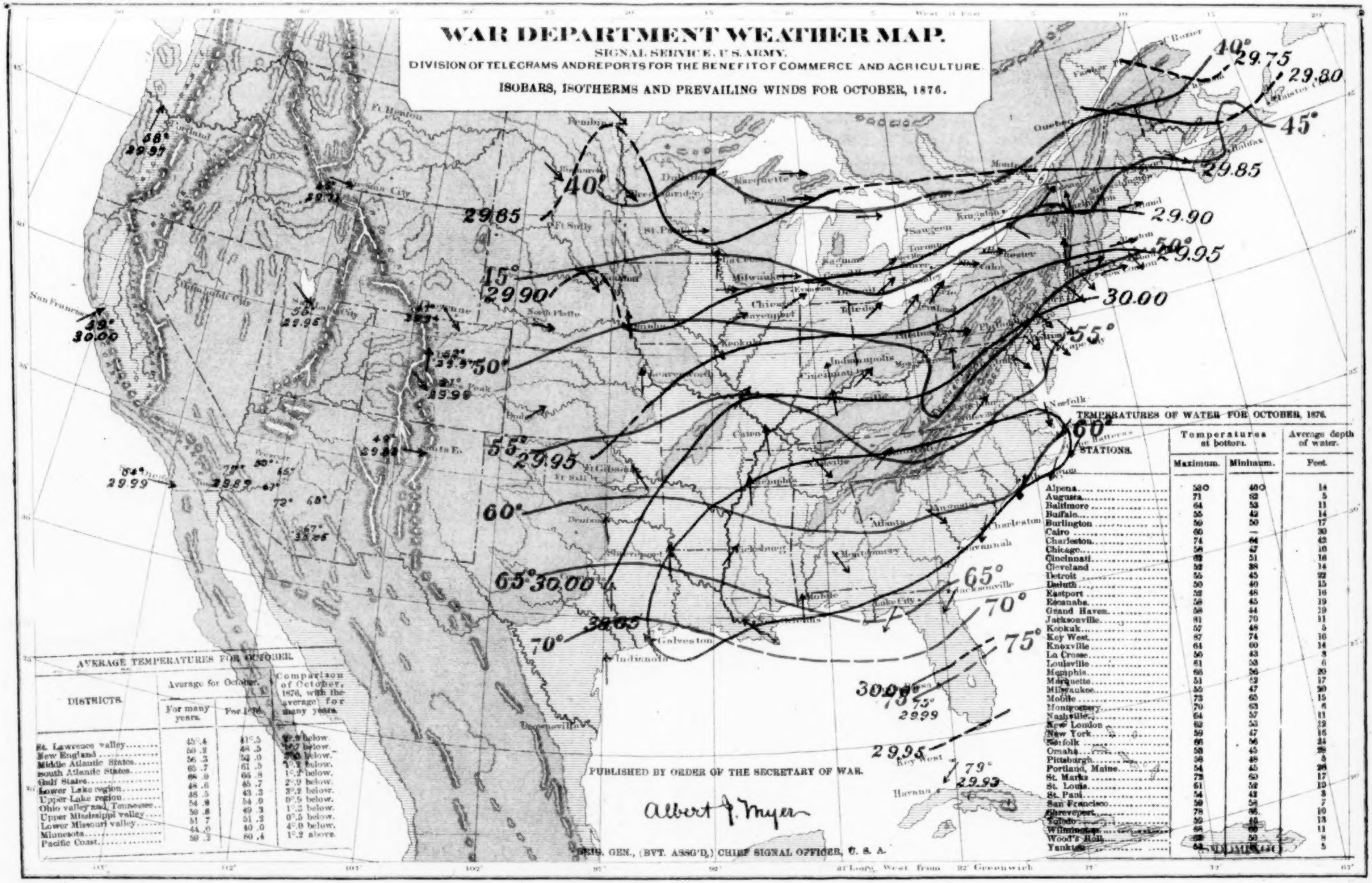
No.	Velocity.	
I.	33	miles per hour.
II.	36	do.
III.	34	do.
IV.	—	do.
V.	[illegible]	do.
VI.	25	do.
VII.	26	do.
VIII.	29	do.
IX.	34	do.

No. 11.

WAR DEPARTMENT WEATHER MAP.

SIGNAL SERVICE, U.S. ARMY.
DIVISION OF TELEGRAMS AND REPORTS FOR THE BENEFIT OF COMMERCE AND AGRICULTURE.

ISOBARS, ISOTHERMS AND PREVAILING WINDS FOR OCTOBER, 1876.


40° 29.75
29.80
45°
29.85
29.90
50°
29.95
30.00
55°
60°
65°
70°
75°
40°
29.85
45°
29.90
50°
55°
29.95
60°
65°
30.00
70°
30.00
29.99
29.95
79°
29.93
58°
29.97
59°
30.00
64°
29.99
Ft. Benton
Portland
San Francisco
Salt Lake City
Denver
Santa Fe
North Platte
Omaha
St. Paul
Duluth
Marquette
Chicago
Milwaukee
Davenport
Keokuk
Indianapolis
Cincinnati
Cairo
Memphis
Vicksburg
Shreveport
Galveston
Indianola
Mobile
Montgomery
Atlanta
Savannah
Charleston
Jacksonville
Key West
Havana
Norfolk
Cape Hatteras
Boston
Montreal
Quebec
Halifax
Buffalo
Toledo
Detroit
Kingston
West from Greenwich

TEMPERATURES OF WATER FOR OCTOBER, 1876.

STATIONS.	Temperatures at bottom. Maximum.	Temperatures at bottom. Minimum.	Average depth of water. Feet.
Alpena	52°	40°	14
Augusta	71	62	5
Baltimore	64	53	11
Buffalo	55	42	14
Burlington	59	50	17
Cairo	66	—	30
Charleston	74	64	42
Chicago	56	47	10
Cincinnati	63	51	16
Cleveland	52	38	14
Detroit	55	45	22
Duluth	50	40	15
Eastport	52	48	16
Escanaba	56	45	19
Grand Haven	56	44	19
Jacksonville	81	70	11
Keokuk	57	48	5
Key West	87	74	16
Knoxville	64	60	14
La Crosse	50	43	8
Louisville	61	53	6
Memphis	66	56	20
Marquette	51	42	17
Milwaukee	55	47	20
Mobile	73	65	15
Montgomery	70	63	6
Nashville	64	57	11
New London	62	53	12
New York	59	47	16
Norfolk	66	56	24
Omaha	58	45	28
Pittsburgh	56	48	5
Portland, Maine	54	45	26
St. Marks	73	60	17
St. Louis	61	52	10
St. Paul	54	42	3
San Francisco	59	56	7
Shreveport	78	65	10
Toledo	59	46	13
Wilmington	68	60	11
Wood's Holl	59	50	8
Yankton	64	[illegible]	5

AVERAGE TEMPERATURES FOR OCTOBER.

DISTRICTS.	Average for October. For many years.	Average for October. For 1876.	Comparison of October, 1876, with the average for many years.
St. Lawrence valley	45°.4	41°.5	[illegible] below.
New England	50 .2	48 .5	[illegible] below.
Middle Atlantic States	56 .3	53 .0	[illegible] below.
South Atlantic States	65 .7	61 .5	[illegible] below.
Gulf States	68 .0	66 .8	1°.2 below.
Lower Lake region	48 .6	45 .7	2°.9 below.
Upper Lake region	46 .5	43 .3	3°.2 below.
Ohio valley and Tennessee	54 .9	54 .0	0°.9 below.
Upper Mississippi valley	50 .6	49 .3	1°.3 below.
Lower Missouri valley	51 7	51 .2	0°.5 below.
Minnesota	44 .0	40 .0	4°.0 below.
Pacific Coast	59 .2	60 .4	1°.2 above.

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Albert J. Myer

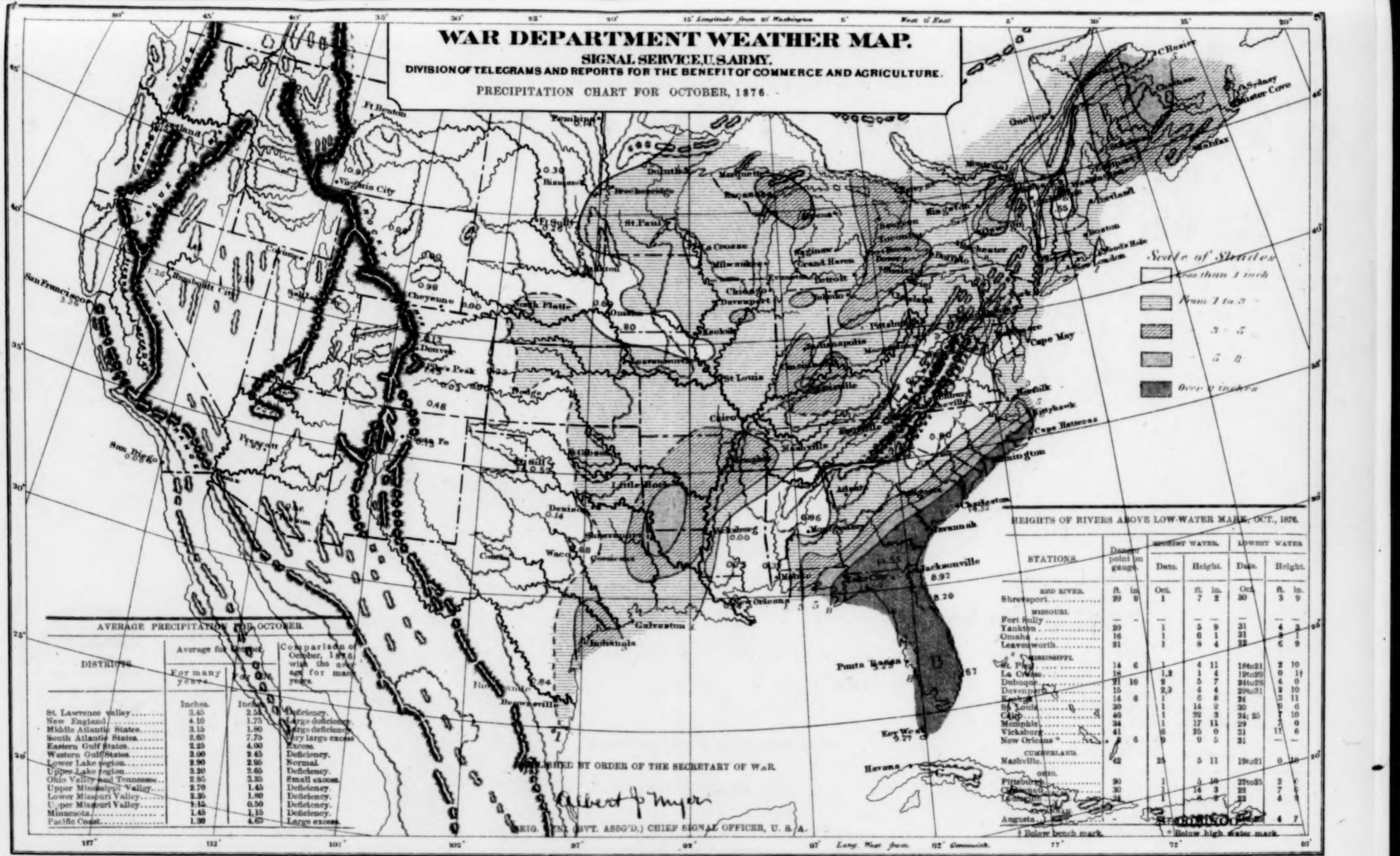
BRIG. GEN., (BVT. ASS'G'D,) CHIEF SIGNAL OFFICER, U. S. A.

WAR DEPARTMENT WEATHER MAP.

SIGNAL SERVICE, U.S. ARMY.

DIVISION OF TELEGRAMS AND REPORTS FOR THE BENEFIT OF COMMERCE AND AGRICULTURE.

PRECIPITATION CHART FOR OCTOBER, 1876.


15° Longitude from W. Washington
West 0 East
Scale of Shades
Less than 1 inch
From 1 to 3
3 5
5 8
Over 8 inches
Ft Benton
Virginia City
Pembina
Bismarck
Duluth
Marquette
St. Paul
La Crosse
Milwaukee
Chicago
Davenport
Omaha
North Platte
Cheyenne
Denver
Pike's Peak
Santa Fe
Dodge
Leavenworth
St Louis
Cairo
Nashville
Little Rock
Shreveport
Vicksburg
New Orleans
Galveston
Indianola
Denison
Waco
Brownsville
Corsicana
Atlanta
Savannah
Charleston
14.32
Jacksonville
8.92
Punta Rassa
Key West
3.27
Havana
Cape Hatteras
Norfolk
Cape May
Pittsburgh
Toledo
Detroit
Grand Haven
Boston
Portland
Wood's Hole
Halifax
Sydney
Chatham
C. Rozier
San Francisco
3.36
San Diego
Salt Lake City
Corinne
Prescott
0.98
0.30
0.48
0.14
0.96
0.00
Long. West from Greenwich
117°
112°
107°
102°
97°
92°
87°
82°
77°
72°
67°
25°
30°
35°
40°
45°

AVERAGE PRECIPITATION FOR OCTOBER.

DISTRICTS.	Average for October. For many years.	Average for October. For 1876.	Comparison of October, 1876, with the average for many years.
	Inches.	Inches.	
St. Lawrence valley	3.45	2.55	Deficiency.
New England	4.10	1.75	Large deficiency.
Middle Atlantic States	3.15	1.60	Large deficiency.
South Atlantic States	2.60	7.75	Very large excess
Eastern Gulf States	2.25	4.00	Excess.
Western Gulf States	3.00	2.45	Deficiency.
Lower Lake region	2.90	2.95	Normal.
Upper Lake region	3.20	2.65	Deficiency.
Ohio Valley and Tennessee	2.85	3.35	Small excess.
Upper Mississippi Valley	2.70	1.45	Deficiency.
Lower Missouri Valley	2.35	1.80	Deficiency.
Upper Missouri Valley	1.15	0.50	Deficiency.
Minnesota	1.45	1.15	Deficiency.
Pacific Coast	1.30	4.65	Large excess.

HEIGHTS OF RIVERS ABOVE LOW-WATER MARK, OCT., 1876.

STATIONS.	Danger point on gauge.		HIGHEST WATER.			LOWEST WATER.		
			Date.	Height.		Date.	Height.	
RED RIVER.	ft.	in.	Oct.	ft.	in.	Oct.	ft.	in.
Shreveport	29	9	1	7	2	30	3	9
MISSOURI.								
Fort Sully	—	—	—	—	—	—	—	—
Yankton	20		1	5	9	31	4	3
Omaha	16		1	6	1	31	[illegible]	1
Leavenworth	21		1	8	4	22	6	9
MISSISSIPPI.								
St. Paul	14	6	1	4	11	18to21	2	10
La Crosse	16		1,2	1	4	19to29	0	1†
Dubuque	21	10	2	5	7	24to28	4	0
Davenport	15		2,3	4	4	29to31	2	10
Keokuk	14	6	1	6	8	24	3	11
St. Louis	30		1	14	9	30	[illegible]	6
Cairo	40		1	22	3	24; 25	7	10
Memphis	34		1	17	11	29	7	0
Vicksburg	41		6	25	0	31	11	6
New Orleans *	[illegible]	6	9	9	5	31	—	—
CUMBERLAND.								
Nashville	42		25	5	11	19to21	0	10
OHIO.								
Pittsburgh	20		1	5	10	22to25	2	[illegible]
Cincinnati	30		1	14	3	23	7	[illegible]
Louisville	24		1	[illegible]	[illegible]	22	4	[illegible]
SAVANNAH.								
Augusta	—		[illegible]	[illegible]	[illegible]	[illegible]	4	7

† Below bench mark.

* Below high water mark.

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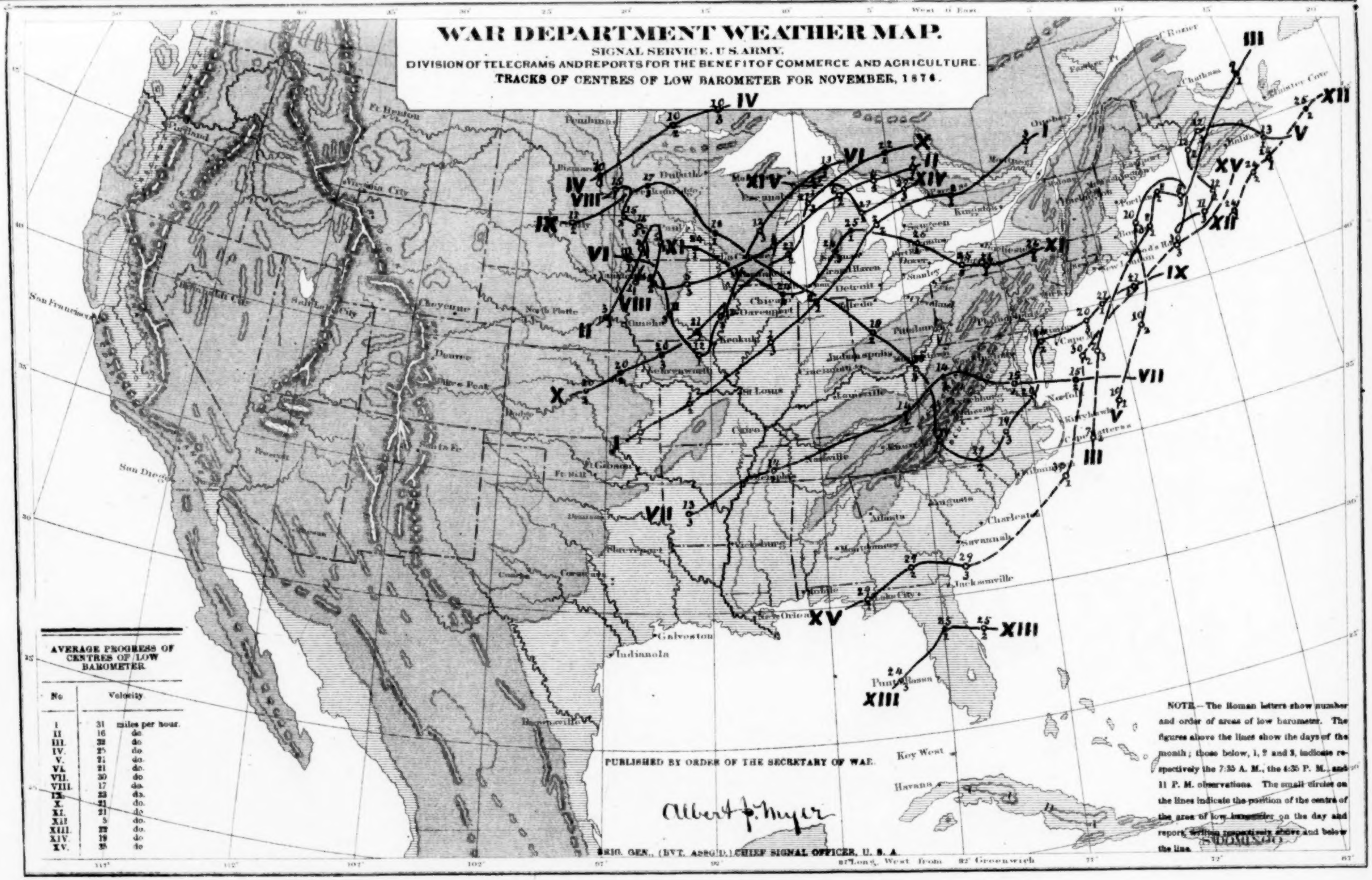
BRIG. GEN'L (BVT. ASSG'D,) CHIEF SIGNAL OFFICER, U. S. A.

N. PETERS, PHOTO-LITHOGRAPHER, WASHINGTON, D. C.

WAR DEPARTMENT WEATHER MAP.

SIGNAL SERVICE, U.S. ARMY.
DIVISION OF TELEGRAMS AND REPORTS FOR THE BENEFIT OF COMMERCE AND AGRICULTURE.

TRACKS OF CENTRES OF LOW BAROMETER FOR NOVEMBER, 1876.


I
II
III
IV
V
VI
VII
VIII
IX
X
XI
XII
XIII
XIV
XV
Ft. Benton
Pembina
Portland
Virginia City
Salt Lake City
Cheyenne
North Platte
Denver
San Francisco
San Diego
Santa Fe
Duluth
Escanaba
St. Paul
Chicago
Davenport
Keokuk
St. Louis
Cairo
Louisville
Cincinnati
Indianapolis
Detroit
Toledo
Grand Haven
Pittsburg
Knoxville
Memphis
Nashville
Ft. Gibson
Ft. Sill
Shreveport
Vicksburg
Galveston
Indianola
Brownsville
New Orleans
Mobile
Montgomery
Atlanta
Augusta
Charleston
Savannah
Jacksonville
Cedar Keys
Punta Rassa
Key West
Havana
Wilmington
Cape Hatteras
Norfolk
Cape May
New York
Kingston
Montreal
Quebec
Chatham
Cape Rozier
Father Pt.
Santo Domingo
West 0 East
Long. West from Greenwich

No	Velocity	
I	31	miles per hour.
II	16	do
III.	33	do
IV.	25	do
V.	24	do.
VI.	21	do.
VII.	30	do
VIII.	17	do.
IX.	23	do.
X.	21	do.
XI.	21	do
XII	5	do.
XIII.	22	do.
XIV.	19	do
XV.	35	do

AVERAGE PROGRESS OF CENTRES OF LOW BAROMETER.

NOTE.—The Roman letters show number and order of areas of low barometer. The figures above the lines show the days of the month; those below, 1, 2 and 3, indicate respectively the 7:35 A. M., the 4:35 P. M., and 11 P. M. observations. The small circles on the lines indicate the position of the centre of the area of low barometer on the day and report, written respectively above and below the line.

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Albert J. Myer

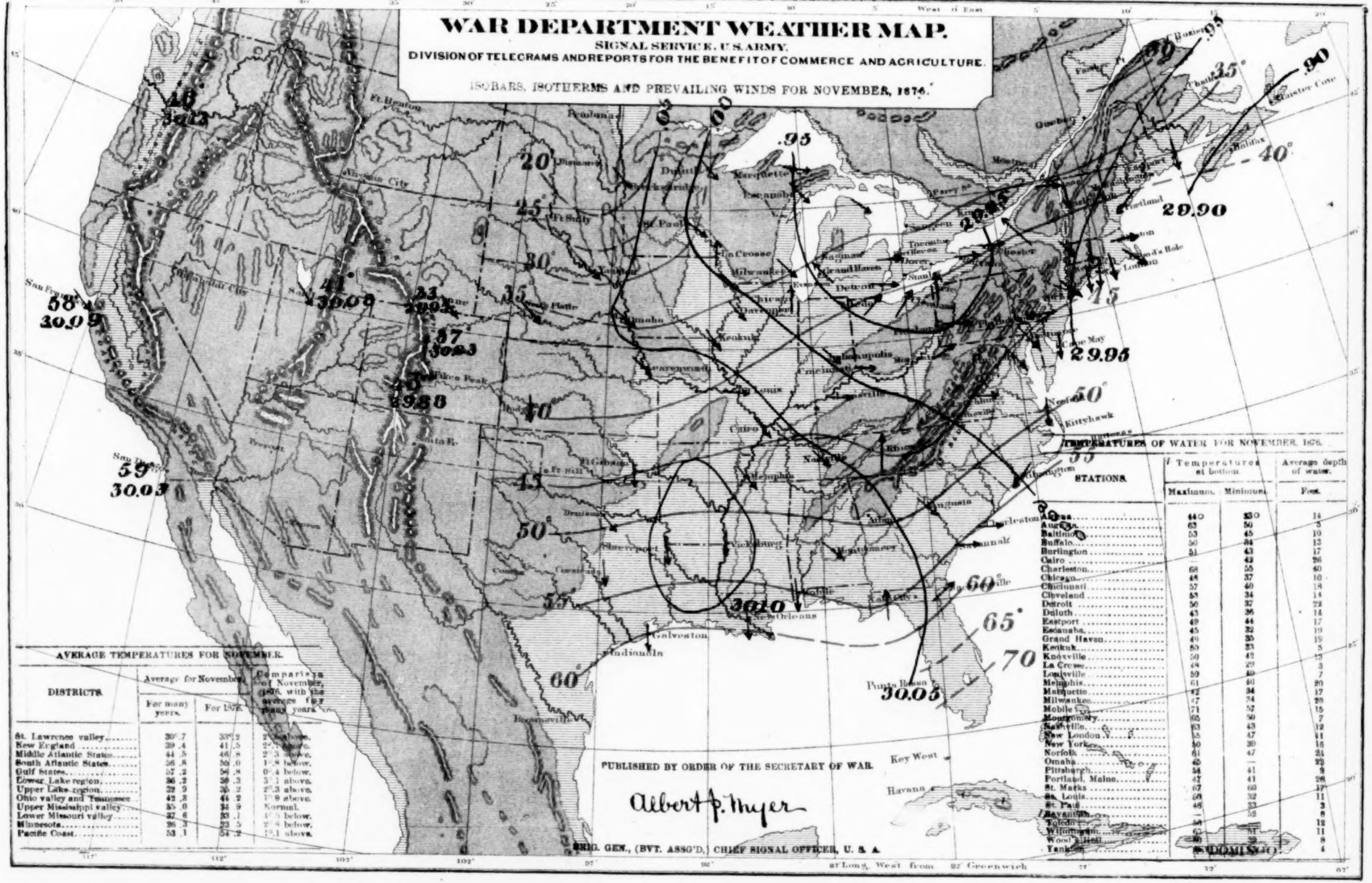
BRIG. GEN., (BVT. ASSG'D.) CHIEF SIGNAL OFFICER, U. S. A.

No. 11.

WAR DEPARTMENT WEATHER MAP.

SIGNAL SERVICE, U.S. ARMY.
DIVISION OF TELEGRAMS AND REPORTS FOR THE BENEFIT OF COMMERCE AND AGRICULTURE.

ISOBARS, ISOTHERMS AND PREVAILING WINDS FOR NOVEMBER, 1876.



20°
25°
30°
35°
40°
45°
50°
55°
60°
65°
70°
40°
35°
45
.95
.90
29.90
29.95
29.95
30.05
30.10
30.03
30.09
30.00
30.03
29.88
Ft. Benton
Virginia City
Salt Lake City
Pikes Peak
Santa Fe
Pembina
Bismarck
Ft. Sully
Yankton
North Platte
Omaha
Duluth
St. Paul
La Crosse
Milwaukee
Chicago
Marquette
Escanaba
Grand Haven
Detroit
Toledo
Cleveland
Buffalo
Rochester
Keokuk
Leavenworth
St. Louis
Cincinnati
Indianapolis
Louisville
Cairo
Nashville
Knoxville
Memphis
Ft. Gibson
Ft. Sill
Denison
Shreveport
Vicksburg
Mobile
New Orleans
Galveston
Indianola
Brownsville
Montgomery
Augusta
Savannah
Charleston
Wilmington
Norfolk
Kittyhawk
Cape May
Portland
Boston
Wood's Hole
New London
Eastport
Halifax
Sydney
Quebec
Montreal
Toronto
San Francisco
San Diego
Punta Rassa
Key West
Havana
S. DOMINGO
West 0 East
117°
112°
107°
102°
97°
92°
87 Long. West from 82 Greenwich
77°
72°
67°

AVERAGE TEMPERATURES FOR NOVEMBER.

DISTRICTS	Average for November.		Comparison of November, 1876, with the average for many years
	For many years.	For 1876.	
St. Lawrence valley	30°.7	33°.2	2°.[illegible] above.
New England	39 .4	41 .5	2°.1 above.
Middle Atlantic States	44 .5	46 .8	2°.3 above.
South Atlantic States	56 .8	55 .0	1°.8 below.
Gulf States	57 .2	56 .8	0°.4 below.
Lower Lake region	36 .2	39 .3	3°.1 above.
Upper Lake region	32 .9	35 .2	2°.3 above.
Ohio valley and Tennessee	42 .3	44 .2	1°.9 above.
Upper Mississippi valley	35 .0	34 .9	Normal.
Lower Missouri valley	37 .6	33 .1	4°.5 below.
Minnesota	26 .3	23 .5	2°.8 below.
Pacific Coast	53 .1	54 .2	1°.1 above.

TEMPERATURES OF WATER FOR NOVEMBER, 1876.

STATIONS	Temperatures at bottom.		Average depth of water.
	Maximum.	Minimum.	Feet.
Alpena	44	33	14
Augusta	63	50	5
Baltimore	53	45	10
Buffalo	50	34	13
Burlington	51	43	17
Cairo	—	42	26
Charleston	68	55	40
Chicago	48	37	10
Cincinnati	57	40	18
Cleveland	53	34	14
Detroit	50	37	23
Duluth	43	36	14
Eastport	49	44	17
Escanaba	45	32	19
Grand Haven	49	35	19
Keokuk	50	33	5
Knoxville	50	42	13
La Crosse	48	29	3
Louisville	50	40	7
Memphis	61	40	20
Marquette	42	34	17
Milwaukee	47	34	20
Mobile	71	57	15
Montgomery	65	50	7
Nashville	53	43	12
New London	55	47	11
New York	50	39	16
Norfolk	61	47	24
Omaha	45	—	23
Pittsburgh	54	41	9
Portland, Maine	47	41	26
St. Marks	67	60	17
St. Louis	60	32	11
St. Paul	46	33	3
Savannah	—	52	8
Toledo	50	[illegible]	12
Wilmington	62	51	11
Wood's Holl	[illegible]	[illegible]	8
Yankton	[illegible]	[illegible]	4

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Albert J. Myer

BRIG. GEN., (BVT. ASSG'D,) CHIEF SIGNAL OFFICER, U. S. A.

No. III.

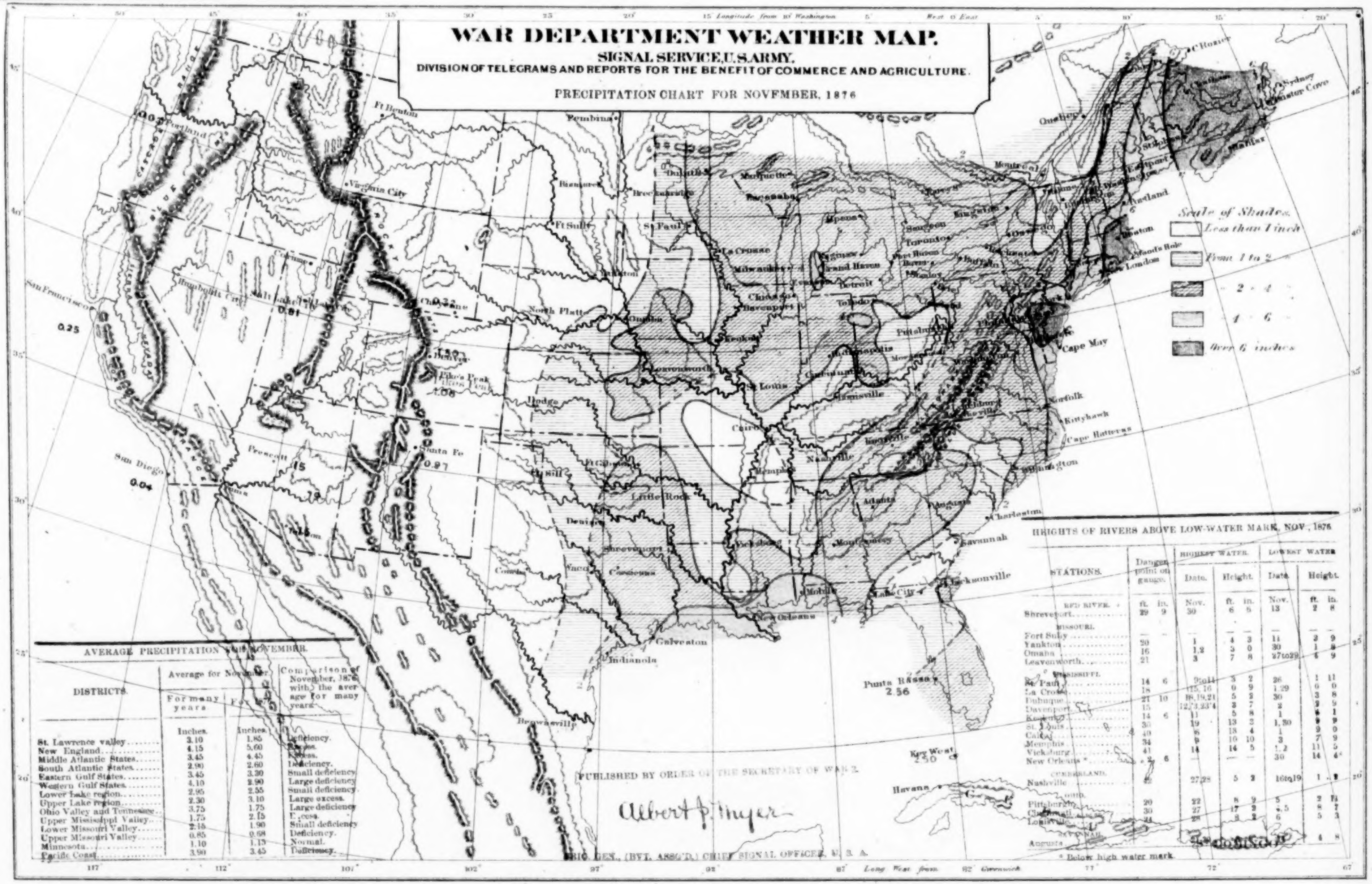
50
45
40
35
30
25
20
15 Longitude from W. Washington
5
West 0 East
5
10
15
20

WAR DEPARTMENT WEATHER MAP.

SIGNAL SERVICE, U.S. ARMY.

DIVISION OF TELEGRAMS AND REPORTS FOR THE BENEFIT OF COMMERCE AND AGRICULTURE.

PRECIPITATION CHART FOR NOVEMBER, 1876


Scale of Shades.
Less than 1 inch
From 1 to 2 "
" 2 " 4 "
" 4 " 6 "
Over 6 inches
15 Longitude from W Washington
West 0 East
Long West from Greenwich
0.25
0.81
0.97
0.04
1.08
2.56
2.50
San Francisco
San Diego
Portland
Virginia City
Salt Lake City
Santa Fe
Prescott
Cheyenne
Denver
Pike's Peak
North Platte
Bismarck
Pembina
Ft Benton
Ft Sully
St Paul
Duluth
Omaha
Dodge
Leavenworth
St Louis
Cairo
Memphis
Little Rock
Shreveport
Corsicana
Galveston
Indianola
Brownsville
New Orleans
Mobile
Nashville
Knoxville
Atlanta
Augusta
Savannah
Charleston
Wilmington
Cape Hatteras
Kittyhawk
Norfolk
Cape May
Pittsburgh
Toledo
Detroit
Chicago
Milwaukee
La Crosse
Grand Haven
Buffalo
Toronto
Rochester
Oswego
Montreal
Quebec
Boston
New London
Portland
Eastport
Halifax
Sydney
Punta Rassa
Key West
Havana

AVERAGE PRECIPITATION FOR NOVEMBER.

DISTRICTS.	Average for November.		Comparison of November, 1876, with the average for many years.
	For many years.	For 1876.	
	Inches.	Inches.	
St. Lawrence valley	3.10	1.85	Deficiency.
New England	4.15	5.60	Excess.
Middle Atlantic States	3.45	4.45	Excess.
South Atlantic States	2.90	2.60	Deficiency.
Eastern Gulf States	3.45	3.30	Small deficiency.
Western Gulf States	4.10	2.90	Large deficiency
Lower Lake region	2.95	2.55	Small deficiency.
Upper Lake region	2.30	3.10	Large excess.
Ohio Valley and Tennessee	3.75	1.75	Large deficiency
Upper Mississippi Valley	1.75	2.15	Excess.
Lower Missouri Valley	2.15	1.90	Small deficiency
Upper Missouri Valley	0.85	0.68	Deficiency.
Minnesota	1.10	1.15	Normal.
Pacific Coast	3.90	3.45	Deficiency.

HEIGHTS OF RIVERS ABOVE LOW-WATER MARK, NOV., 1876.

STATIONS.	Danger point on gauge.		HIGHEST WATER.			LOWEST WATER.		
			Date.	Height.		Date.	Height.	
	ft.	in.	Nov.	ft.	in.	Nov.	ft.	in.
RED RIVER.								
Shreveport	29	9	30	6	5	13	2	8
MISSOURI.								
Fort Sully	—	—	—	—	—	—	—	—
Yankton	20		1	4	3	11	2	9
Omaha	16		1, 2	5	0	30	1	8
Leavenworth	21		3	7	8	27 to 29	4	9
MISSISSIPPI.								
St. Paul	14	6	9 to 11	3	2	26	1	11
La Crosse	18		15, 16	0	9	1, 29	0	0
Dubuque	21	10	18, 19, 21	5	2	30	3	8
Davenport	15		12, 13, 23, 24	3	7	2	3	9
Keokuk	14	6	11	5	8	1	[illegible]	1
St. Louis	35		19	13	2	1, 30	9	9
Cairo	40		8	13	4	1	9	0
Memphis	34		9	10	10	3	7	9
Vicksburg	41		14	14	5	1, 2	11	5
New Orleans *	2	6	—	—	—	30	14	4*
CUMBERLAND.								
Nashville	42		27, 28	5	2	16 to 19	1	2
OHIO.								
Pittsburgh	20		22	8	9	5	2	11
Cincinnati	30		27	17	2	4, 5	8	7
Louisville	24		28	8	2	6	5	3
SAVANNAH.								
Augusta	—		[illegible]			[illegible]	4	8

* Below high water mark.

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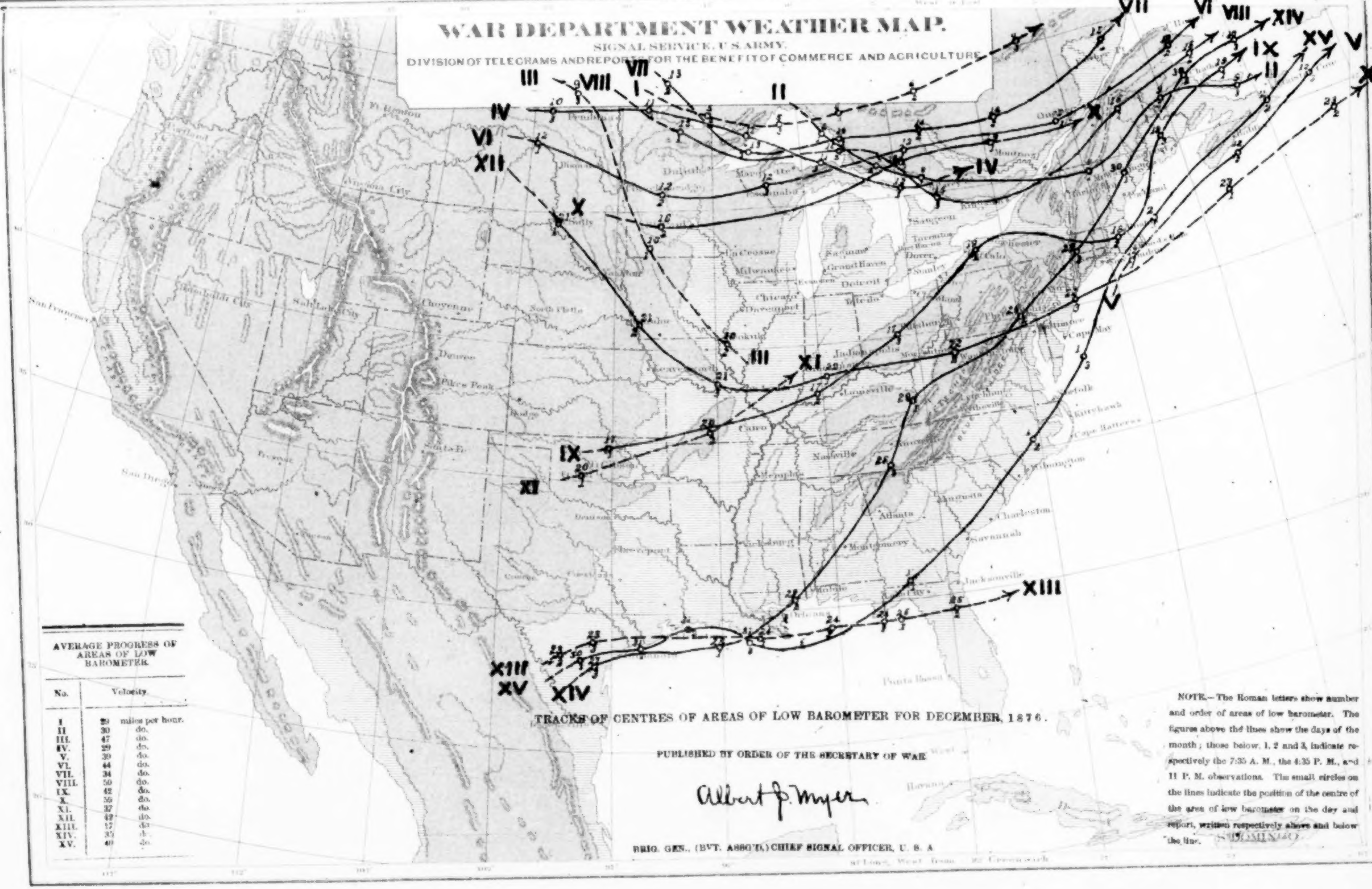
Albert J. Myer

BRIG. GEN., (BVT. ASSG'D,) CHIEF SIGNAL OFFICER, U. S. A.


III
VIII
VII
I
II
IV
VI
XII
X
III
XI
IX
XI
XIII
XV
XIV
XIII
V
IV
VII
VI
VIII
XIV
IX
XV
V
II
XII
X
Ft. Benton
Portland
Virginia City
Salt Lake City
Cheyenne
North Platte
Denver
Pikes Peak
Santa Fe
San Francisco
San Diego
Duluth
Marquette
Escanaba
La Crosse
Milwaukee
Grand Haven
Detroit
Chicago
Davenport
Toledo
Keokuk
Leavenworth
Indianapolis
Louisville
Cairo
Nashville
Memphis
Vicksburg
Shreveport
Denison
Atlanta
Augusta
Montgomery
Mobile
New Orleans
Charleston
Savannah
Jacksonville
Wilmington
Norfolk
Cape Hatteras
Cape May
Baltimore
Saugeen
Toronto
Kingston
Montreal
Punta Rassa
Havana

WAR DEPARTMENT WEATHER MAP.

SIGNAL SERVICE, U.S. ARMY.
DIVISION OF TELEGRAMS AND REPORTS FOR THE BENEFIT OF COMMERCE AND AGRICULTURE.

AVERAGE PROGRESS OF AREAS OF LOW BAROMETER.

No.	Velocity.	
I	29	miles per hour.
II	30	do.
III.	47	do.
IV.	29	do.
V.	39	do.
VI.	44	do.
VII.	34	do.
VIII.	50	do.
IX.	42	do.
X.	56	do.
XI.	37	do.
XII.	42	do.
XIII.	17	do.
XIV.	35	do.
XV.	40	do.

TRACKS OF CENTRES OF AREAS OF LOW BAROMETER FOR DECEMBER, 1876.

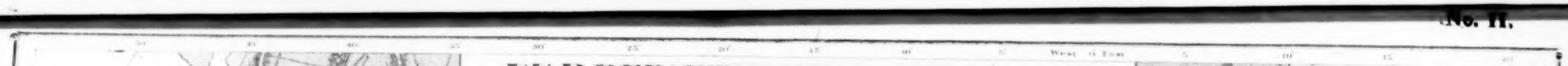
PUBLISHED BY ORDER OF THE SECRETARY OF WAR

Albert J. Myer

BRIG. GEN., (BVT. ASSG'D,) CHIEF SIGNAL OFFICER, U. S. A.

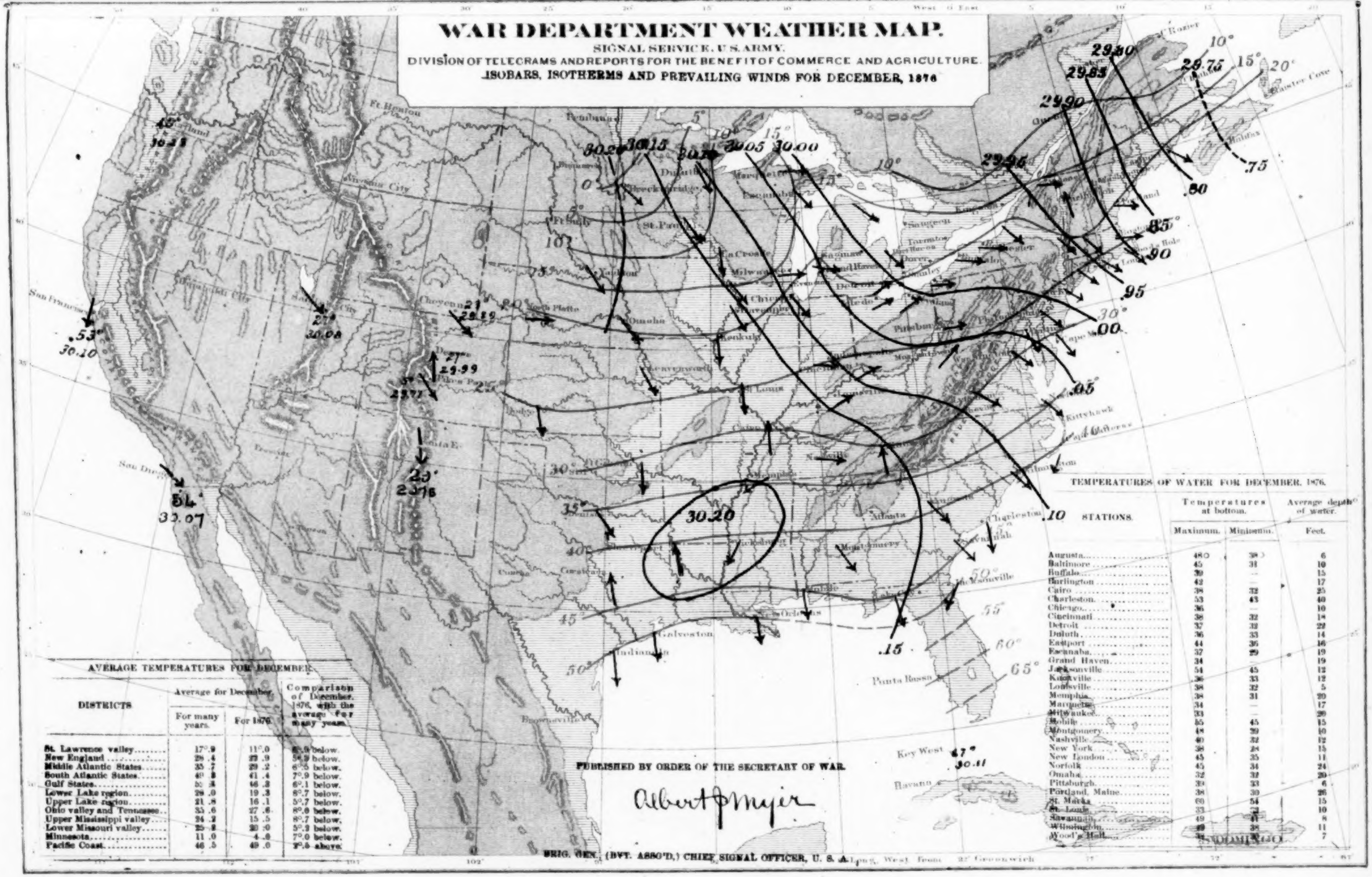
NOTE.—The Roman letters show number and order of areas of low barometer. The figures above the lines show the days of the month; those below, 1, 2 and 3, indicate respectively the 7:35 A. M., the 4:35 P. M., and 11 P. M. observations. The small circles on the lines indicate the position of the centre of the area of low barometer on the day and report, written respectively above and below the line.

No. II.



WAR DEPARTMENT WEATHER MAP.

SIGNAL SERVICE, U.S. ARMY.
DIVISION OF TELEGRAMS AND REPORTS FOR THE BENEFIT OF COMMERCE AND AGRICULTURE.
ISOBARS, ISOTHERMS AND PREVAILING WINDS FOR DECEMBER, 1876


29.80
29.75
29.85
29.90
29.95
10°
15°
20°
.75
.80
.85
.90
.95
.00
.05
.10
.15
30.20
30.15
30.10
30.05
30.00
0°
5°
10°
15°
30°
35°
40°
45°
50°
55°
60°
65°
43°
30.13
53°
30.10
21°
29.89
27°
29.99
29.77
29°
29.76
54°
30.07
67°
30.11
Key West
Havana
Punta Rassa
Galveston
New Orleans
Charleston
St. Louis
Omaha
Duluth
St. Paul
Cheyenne
North Platte
Ft. Benton
San Francisco
San Diego
Virginia City
Brownsville
Indianola
Shreveport
Vicksburg
Montgomery
Atlanta
Jacksonville
Pittsburgh
Kittyhawk
Cape May
Wilmington
Halifax
Eastport
Portland
Quebec
Toronto
Milwaukee
Chicago
Keokuk
Leavenworth
Memphis
Nashville
Detroit
Toledo
Marquette
Escanaba
Cape Hatteras
West from Greenwich
Long.
West 0 East

AVERAGE TEMPERATURES FOR DECEMBER.

DISTRICTS	Average for December, For many years.	Average for December, For 1876.	Comparison of December, 1876, with the average for many years.
St. Lawrence valley	17°.9	11°.0	6°.9 below.
New England	28 .4	22 .9	5°.9 below.
Middle Atlantic States	35 .7	29 .2	6°.5 below.
South Atlantic States	49 .3	41 .4	7°.9 below.
Gulf States	52 .4	46 .3	6°.1 below.
Lower Lake region	28 .0	19 .3	8°.7 below.
Upper Lake region	21 .8	16 .1	5°.7 below.
Ohio valley and Tennessee	35 .6	27 .6	8°.0 below.
Upper Mississippi valley	24 .2	15 .5	8°.7 below.
Lower Missouri valley	25 .2	20 .0	5°.2 below.
Minnesota	11 .0	4 .0	7°.0 below.
Pacific Coast	46 .5	49 .0	2°.5 above.

TEMPERATURES OF WATER FOR DECEMBER, 1876.

STATIONS.	Temperatures at bottom. Maximum.	Temperatures at bottom. Minimum.	Average depth of water. Feet.
Augusta	48°	38°	6
Baltimore	45	31	10
Buffalo	39	—	15
Burlington	42	—	17
Cairo	38	32	25
Charleston	53	43	40
Chicago	36	—	10
Cincinnati	38	32	18
Detroit	37	32	22
Duluth	36	33	14
Eastport	44	36	16
Escanaba	37	29	19
Grand Haven	34	—	19
Jacksonville	54	45	12
Knoxville	36	33	12
Louisville	38	32	5
Memphis	38	31	20
Marquette	34	—	17
Milwaukee	33	—	20
Mobile	55	45	15
Montgomery	48	39	10
Nashville	40	32	12
New York	38	28	15
New London	45	35	11
Norfolk	45	34	24
Omaha	32	32	20
Pittsburgh	39	33	6
Portland, Maine	38	30	26
St. Marks	60	54	15
St. Louis	33	32	10
Savannah	49	41	8
Wilmington	49	38	11
Wood's Hall	35	32	7

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Albert J. Myer

BRIG. GEN. (BVT. ASS'D,) CHIEF SIGNAL OFFICER, U. S. A.

No. III.

20°
15
10
5
West 0 East
5°
15° Longitude from W. Washington
20
25
30°
35
40
45
50

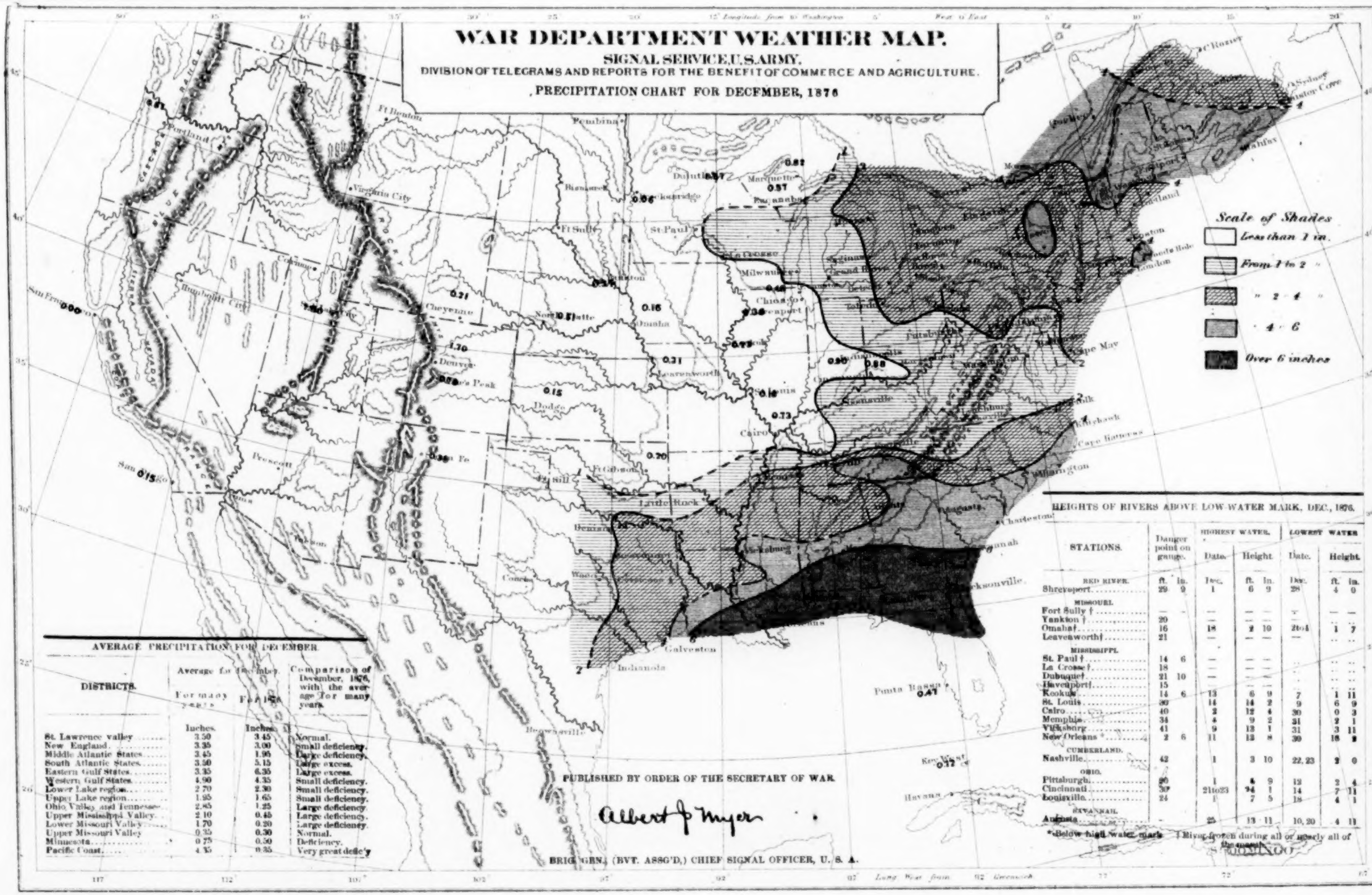
No. III.

WAR DEPARTMENT WEATHER MAP.

SIGNAL SERVICE, U.S. ARMY,

DIVISION OF TELEGRAMS AND REPORTS FOR THE BENEFIT OF COMMERCE AND AGRICULTURE.

PRECIPITATION CHART FOR DECEMBER, 1876


Scale of Shades
☐ Less than 1 in.
▨ From 1 to 2 "
▨ " 2 - 4 "
▨ " 4 - 6
■ Over 6 inches
Longitude from Washington
West
East
Long. West from Greenwich
Portland
Virginia City
Ft Benton
Pembina
Bismarck
Duluth
Marquette
Escanaba
St. Paul
Ft Sully
La Crosse
Milwaukee
Chicago
Davenport
Omaha
North Platte
Cheyenne
Denver
Pike's Peak
Santa Fe
Dodge
Leavenworth
St. Louis
Cairo
Nashville
Little Rock
Ft Gibson
Ft Sill
Denison
Galveston
Indianola
Vicksburg
Augusta
Charleston
Savannah
Jacksonville
Punta Rassa
Key West
Havana
Wilmington
Cape Hatteras
Norfolk
Cape May
Pittsburgh
Toledo
Boston
Woods Hole
New London
Halifax
Quebec
C. Rozier
Sydney
Prescott
Humboldt City
San Francisco
San Diego
Brownsville
0.00
0.15
0.21
1.30
0.15
0.16
0.31
0.20
0.70
0.73
0.37
0.82
0.47
0.72

AVERAGE PRECIPITATION FOR DECEMBER

DISTRICTS.	Average for December. For many years	Average for December. For 1876	Comparison of December, 1876, with the average for many years.
	Inches.	Inches.	
St. Lawrence valley	3.50	3.45	Normal.
New England	3.35	3.00	Small deficiency.
Middle Atlantic States	3.45	1.95	Large deficiency.
South Atlantic States	3.50	5.15	Large excess.
Eastern Gulf States	3.35	6.35	Large excess.
Western Gulf States	4.90	4.35	Small deficiency.
Lower Lake region	2.70	2.30	Small deficiency.
Upper Lake region	1.95	1.65	Small deficiency.
Ohio Valley and Tennessee	2.85	1.25	Large deficiency.
Upper Mississippi Valley	2.10	0.45	Large deficiency.
Lower Missouri Valley	1.70	0.20	Large deficiency.
Upper Missouri Valley	0.35	0.30	Normal.
Minnesota	0.75	0.50	Deficiency.
Pacific Coast	4.35	0.35	Very great defic'y

HEIGHTS OF RIVERS ABOVE LOW-WATER MARK, DEC., 1876.

STATIONS.	Danger point on gauge.		HIGHEST WATER. Date.	HIGHEST WATER. Height.		LOWEST WATER. Date.	LOWEST WATER. Height.	
RED RIVER.	ft.	in.	Dec.	ft.	in.	Dec.	ft.	in.
Shreveport	29	9	1	6	9	28	4	0
MISSOURI.								
Fort Sully †	—		—	—	—	—	—	—
Yankton †	20		—	—	—	—	..	..
Omaha†	16		18	2	10	2to4	1	7
Leavenworth†	21		—	—	—	—	..	..
MISSISSIPPI.								
St. Paul †	14	6	—	—	—	..	..	..
La Crosse†	18		—	—	—	..	..	..
Dubuque†	21	10	—	—	—	..	..	..
Davenport†	15		—	—	—	..	..	..
Keokuk	14	6	13	6	9	7	1	11
St. Louis	30		14	14	2	9	6	9
Cairo	40		2	12	4	30	0	3
Memphis	34		4	9	2	31	2	1
Vicksburg	41		9	13	1	31	3	11
New Orleans *	2	6	11	13	8	30	18	9
CUMBERLAND.								
Nashville	42		1	3	10	22, 23	2	0
OHIO.								
Pittsburgh	20		1	6	9	12	2	4
Cincinnati	50		21to23	24	1	14	7	11
Louisville	24		1	7	5	18	4	1
SAVANNAH.								
Augusta	-		25	13	11	10, 20	4	11

*Below high water mark. † River frozen during all or nearly all of the month.

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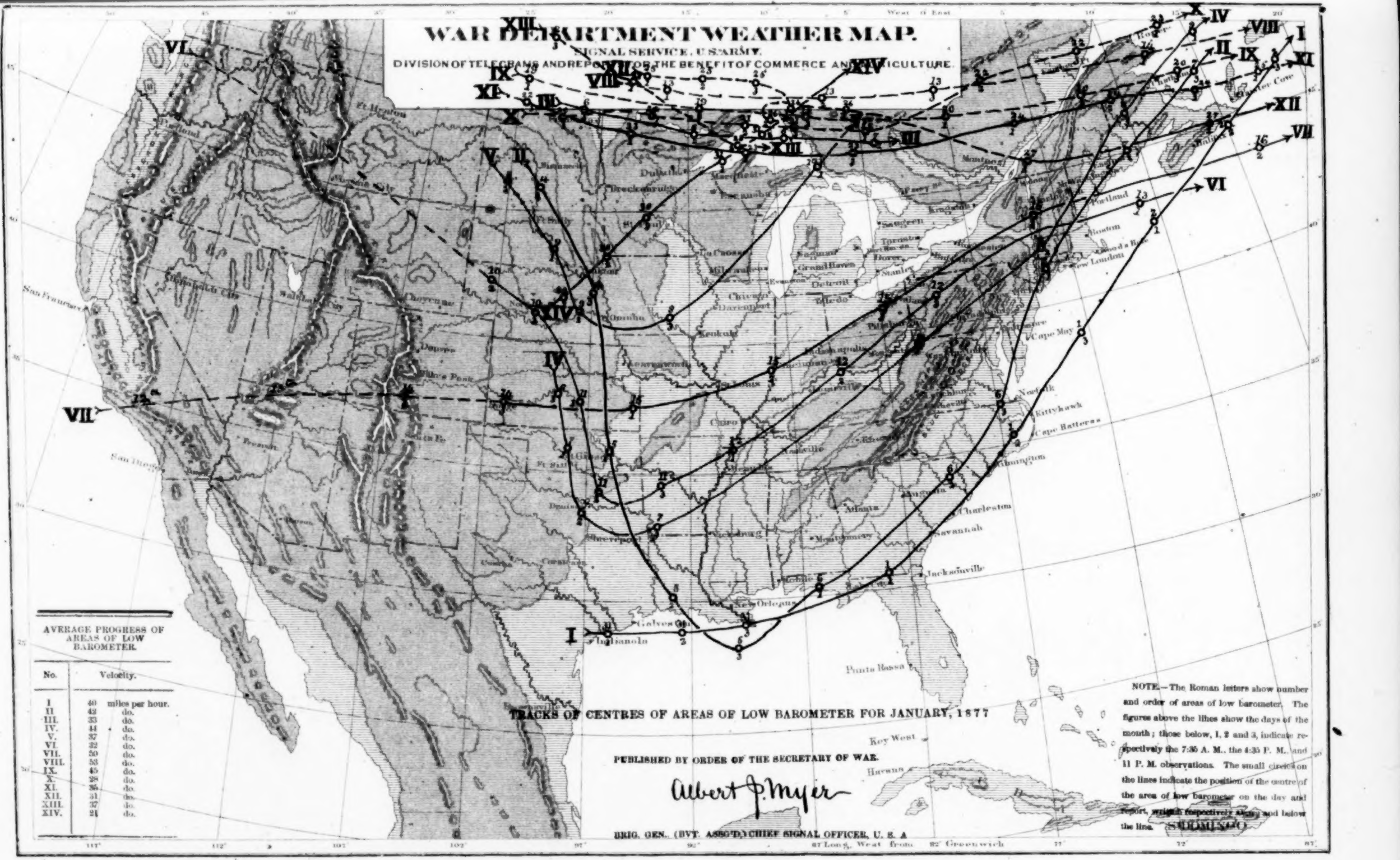
Albert J. Myer

BRIG. GEN., (BVT. ASSG'D,) CHIEF SIGNAL OFFICER, U. S. A.

No. 1.
IV
West of East
XIII

No. 1.


VI
VII
I
II
III
IV
V
VIII
IX
X
XI
XII
XIII
XIV
West 0 East
San Francisco
San Diego
Cheyenne
Denver
Pikes Peak
Santa Fe
Duluth
Breckenridge
Omaha
Keokuk
Chicago
Detroit
Milwaukee
Toledo
Montreal
Portland
Boston
New London
Cape May
Norfolk
Kittyhawk
Cape Hatteras
Wilmington
Charleston
Savannah
Jacksonville
Atlanta
Montgomery
Vicksburg
Shreveport
New Orleans
Galveston
Indianola
Punta Rassa
Key West
Havana
San Domingo
87 Long. West from 82 Greenwich

WAR DEPARTMENT WEATHER MAP.

SIGNAL SERVICE, U.S. ARMY.

DIVISION OF TELEGRAMS AND REPORTS FOR THE BENEFIT OF COMMERCE AND AGRICULTURE.

TRACKS OF CENTRES OF AREAS OF LOW BAROMETER FOR JANUARY, 1877

AVERAGE PROGRESS OF AREAS OF LOW BAROMETER.

No.	Velocity.	
I	40	miles per hour.
II	42	do.
III.	33	do.
IV.	44	do.
V.	37	do.
VI.	32	do.
VII.	50	do.
VIII.	53	do.
IX.	45	do.
X.	28	do.
XI.	36	do.
XII.	31	do.
XIII.	37	do.
XIV.	21	do.

NOTE.—The Roman letters show number and order of areas of low barometer. The figures above the lines show the days of the month; those below, 1, 2 and 3, indicate respectively the 7:35 A. M., the 4:35 P. M. and 11 P. M. observations. The small circles on the lines indicate the position of the centre of the area of low barometer on the day and report, written respectively above and below the line.

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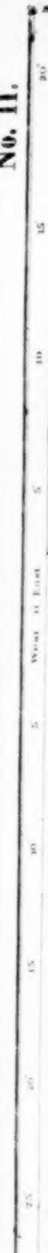
Albert J. Myer

BRIG. GEN. (BVT. ASSG'D.) CHIEF SIGNAL OFFICER, U. S. A.

No. II.

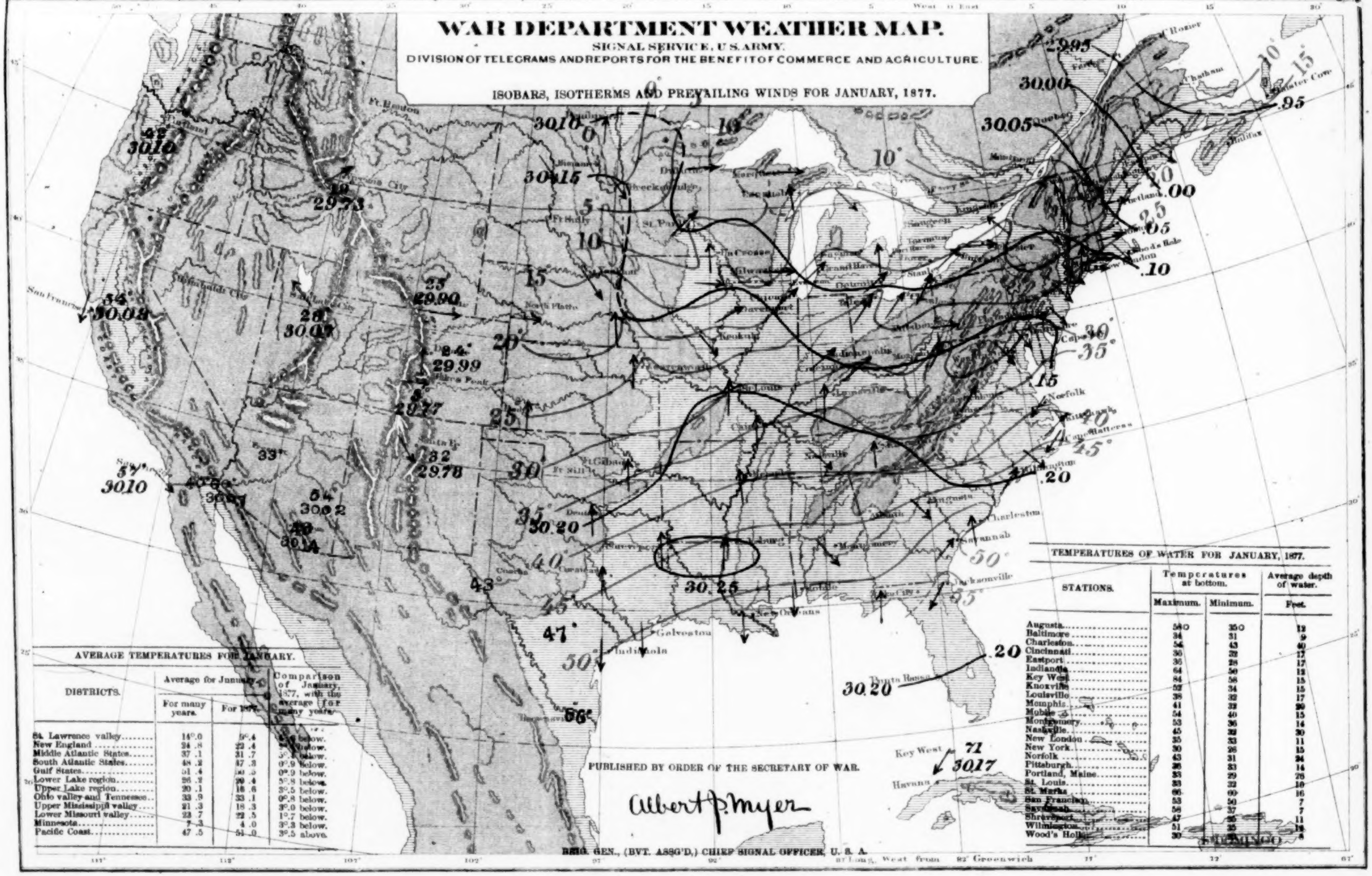


No. 11.

WAR DEPARTMENT WEATHER MAP.

SIGNAL SERVICE, U. S. ARMY.
DIVISION OF TELEGRAMS AND REPORTS FOR THE BENEFIT OF COMMERCE AND AGRICULTURE.

ISOBARS, ISOTHERMS AND PREVAILING WINDS FOR JANUARY, 1877.


30.10
29.73
30.08
30.07
29.90
29.99
29.77
29.78
30.02
30.10
30.15
30.05
30.00
29.95
.95
.00
.05
.10
.15
.20
30.20
30.25
30.17
10°
15°
20°
25°
30°
35°
40°
45°
50°
55°
Ft. Benton
North Platte
St. Paul
Keokuk
St. Louis
Norfolk
Cape Hatteras
Charleston
Savannah
Jacksonville
New Orleans
Galveston
Indianola
Punta Rassa
Key West
Havana
San Francisco
Portland
Chatham
Halifax
87° Long. West from 82° Greenwich

AVERAGE TEMPERATURES FOR JANUARY.

DISTRICTS.	Average for January.		Comparison of January, 1877, with the average for many years.
	For many years.	For 1877.	
St. Lawrence valley	14°.0	9°.4	[illegible] below.
New England	24 .8	23 .4	[illegible] below.
Middle Atlantic States	37 .1	31 .7	5°.[illegible] below.
South Atlantic States	48 .2	47 .3	0°.9 below.
Gulf States	51 .4	50 .5	0°.9 below.
Lower Lake region	26 .2	20 .4	5°.8 below.
Upper Lake region	20 .1	16 .6	3°.5 below.
Ohio valley and Tennessee	33 .9	33 .1	0°.8 below.
Upper Mississippi valley	21 .3	18 .3	3°.0 below.
Lower Missouri valley	23 .7	22 .5	1°.7 below.
Minnesota	7 .3	4 .0	3°.3 below.
Pacific Coast	47 .5	51 .0	3°.5 above.

TEMPERATURES OF WATER FOR JANUARY, 1877.

STATIONS.	Temperatures at bottom.		Average depth of water.
	Maximum.	Minimum.	Feet.
Augusta	54°	35°	12
Baltimore	34	31	9
Charleston	54	43	40
Cincinnati	36	32	17
Eastport	36	28	17
Indianola	64	50	12
Key West	84	56	15
Knoxville	52	34	15
Louisville	38	32	17
Memphis	41	32	20
Mobile	54	40	15
Montgomery	53	36	16
Nashville	45	32	30
New London	35	33	11
New York	30	26	15
Norfolk	43	31	24
Pittsburgh	36	33	14
Portland, Maine	35	29	25
St. Louis	33	32	10
St. Marks	66	60	16
San Francisco	53	50	7
Savannah	56	37	7
Shreveport	47	35	11
Wilmington	51	35	18
Wood's Holl	30	[illegible]	8

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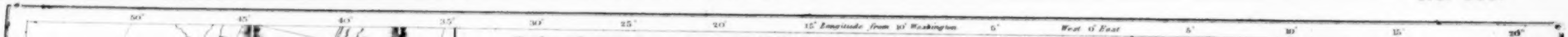
Albert J. Myer

BRIG. GEN., (BVT. ASSG'D,) CHIEF SIGNAL OFFICER, U. S. A.

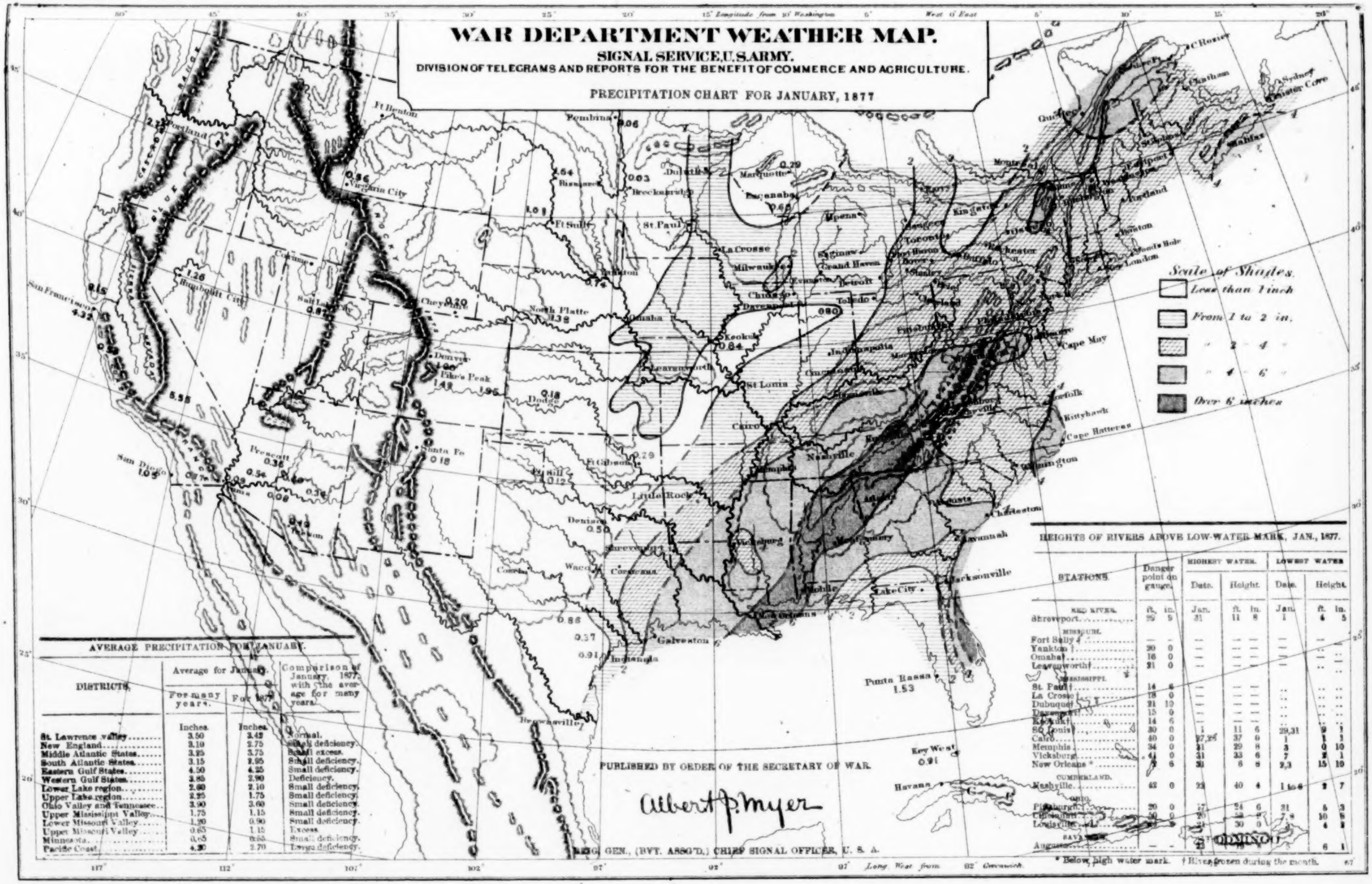
No. 111.


50°
45°
40°
35°
30°
25°
20°
15° Longitude from 10° Washington
5°
West 0 East
5°
10°
15°
20°

WAR DEPARTMENT WEATHER MAP.

SIGNAL SERVICE, U.S. ARMY.
DIVISION OF TELEGRAMS AND REPORTS FOR THE BENEFIT OF COMMERCE AND AGRICULTURE.

PRECIPITATION CHART FOR JANUARY, 1877



AVERAGE PRECIPITATION FOR JANUARY.

DISTRICTS.	Average for January. For many years.	Average for January. For 1877.	Comparison of January, 1877, with the average for many years.
	Inches.	Inches.	
St. Lawrence valley	3.50	2.42	Normal.
New England	3.10	2.75	Small deficiency.
Middle Atlantic States	3.25	3.75	Small excess.
South Atlantic States	3.15	2.95	Small deficiency.
Eastern Gulf States	4.50	4.25	Small deficiency.
Western Gulf States	3.85	2.90	Deficiency.
Lower Lake region	2.60	2.10	Small deficiency.
Upper Lake region	2.25	1.75	Small deficiency.
Ohio Valley and Tennessee	3.90	3.60	Small deficiency.
Upper Mississippi Valley	1.75	1.15	Small deficiency.
Lower Missouri Valley	1.20	0.90	Small deficiency.
Upper Missouri Valley	0.65	1.15	Excess.
Minnesota	0.65	0.55	Small deficiency.
Pacific Coast	4.30	2.70	Large deficiency.

HEIGHTS OF RIVERS ABOVE LOW-WATER MARK, JAN., 1877.

STATIONS.	Danger point on gauge.		HIGHEST WATER. Date.	HIGHEST WATER. Height.		LOWEST WATER. Date.	LOWEST WATER. Height.	
	ft.	in.	Jan.	ft.	in.	Jan.	ft.	in.
RED RIVER.								
Shreveport	29	9	31	11	8	1	4	5
MISSOURI.								
Fort Sully †	—	—	—	—	—	—	—	—
Yankton †	20	0	—	—	—	—	..	—
Omaha †	16	0	—	—	—	—	—	..
Leavenworth †	21	0	—	—	—	—	..	..
MISSISSIPPI.								
St. Paul †	14	6	—	—	—	..	..	..
La Crosse †	18	0	—	—	—	..	..	..
Dubuque †	21	10	—	—	—	..	..	..
Davenport †	15	0	—	—	—	..	..	..
Keokuk †	14	6	—	—	—	..	..	..
St. Louis †	30	0	1	11	6	29,31	9	1
Cairo	40	0	27,28	37	0	1	1	1
Memphis	34	0	31	29	8	3	0	10
Vicksburg	41	0	31	33	6	7	2	1
New Orleans *	3	6	31	8	8	2,3	15	10
CUMBERLAND.								
Nashville	42	0	23	40	4	1 to 6	2	7
OHIO.								
Pittsburgh	20	0	17	24	6	31	5	3
Cincinnati	50	0	20	52	[illegible]	7,8	10	8
Louisville	[illegible]	[illegible]	21	30	0	[illegible]	4	8
SAVANNAH.								
Augusta	—	–	23	[illegible]	[illegible]	[illegible]	6	1

* Below high water mark. † River frozen during the month.

PUBLISHED BY ORDER OF THE SECRETARY OF WAR.

Albert J. Myer

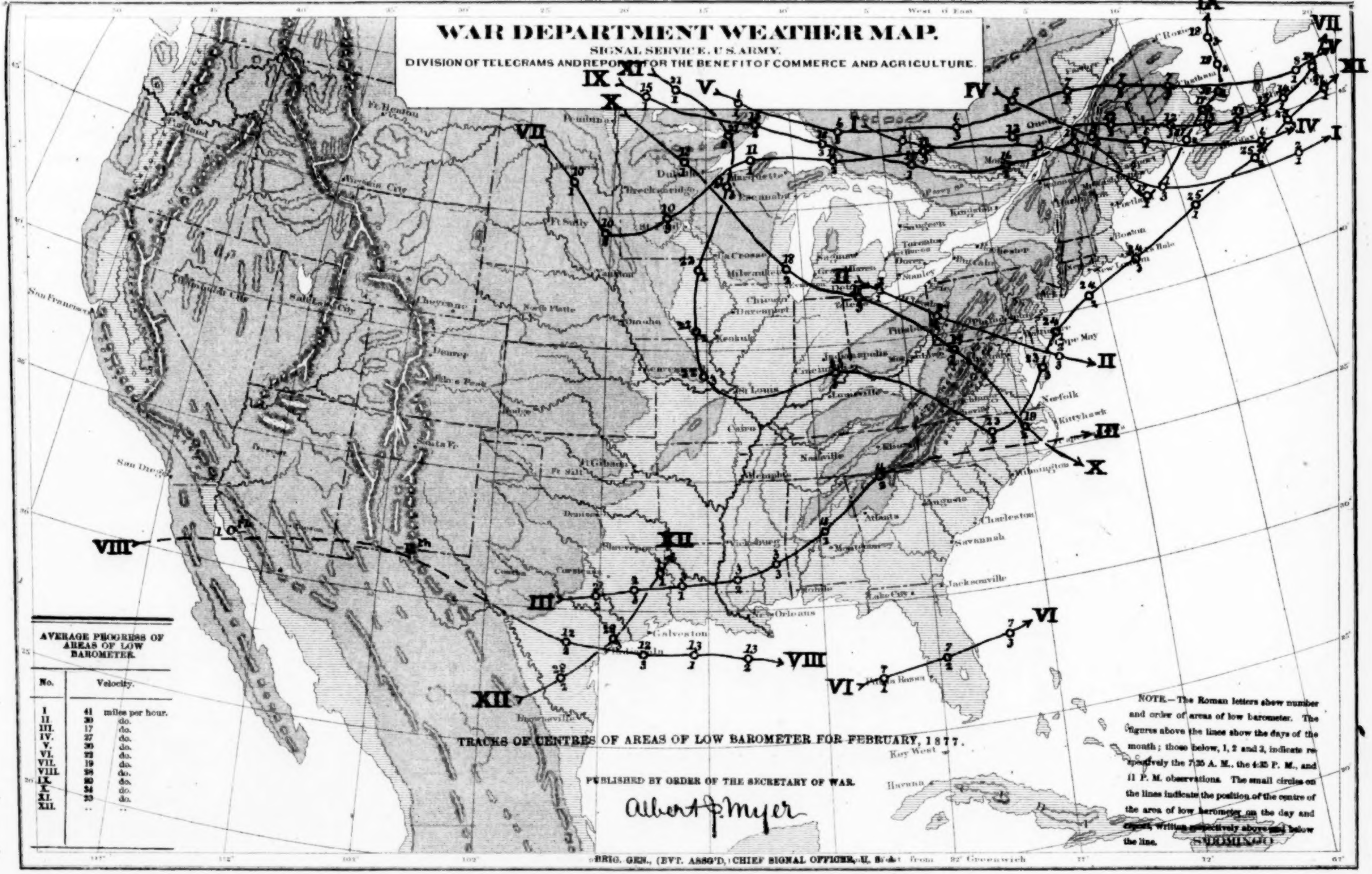
BRIG. GEN., (BVT. ASSO'D,) CHIEF SIGNAL OFFICER, U. S. A.

No. 1.
West 0 East

WAR DEPARTMENT WEATHER MAP.

SIGNAL SERVICE, U. S. ARMY.

DIVISION OF TELEGRAMS AND REPORTS FOR THE BENEFIT OF COMMERCE AND AGRICULTURE.


IX
XI
V.
X
VII
IV
I
II
III
VI
VIII
XII
Ft. Benton
Virginia City
Salt Lake City
Cheyenne
North Platte
Omaha
Denver
Pike's Peak
Santa Fe
San Francisco
San Diego
Portland
Duluth
Breckenridge
Marquette
Escanaba
La Crosse
Milwaukee
Chicago
Davenport
Keokuk
St. Louis
Cairo
Indianapolis
Cincinnati
Louisville
Nashville
Memphis
Vicksburg
Shreveport
New Orleans
Galveston
Brownsville
Mobile
Montgomery
Atlanta
Augusta
Savannah
Charleston
Jacksonville
Key West
Havana
Pittsburg
Buffalo
Toronto
Rochester
Boston
Portland
Quebec
Montreal
New York
Cape May
Norfolk
Kittyhawk
Wilmington
Punta Rassa
St. Domingo
West
0
East
Greenwich

AVERAGE PROGRESS OF AREAS OF LOW BAROMETER.	
No.	Velocity.
I	41 miles per hour.
II.	30 do.
III.	17 do.
IV.	27 do.
V.	30 do.
VI.	22 do.
VII.	19 do.
VIII.	28 do.
IX.	20 do.
X.	34 do.
XI.	23 do.
XII.	.. ..

TRACKS OF CENTRES OF AREAS OF LOW BAROMETER FOR FEBRUARY, 1877.

NOTE.—The Roman letters show number and order of areas of low barometer. The figures above the lines show the days of the month; those below, 1, 2 and 3, indicate respectively the 7:35 A. M., the 4:35 P. M., and 11 P. M. observations. The small circles on the lines indicate the position of the centre of the area of low barometer on the day and report, written respectively above and below the line.

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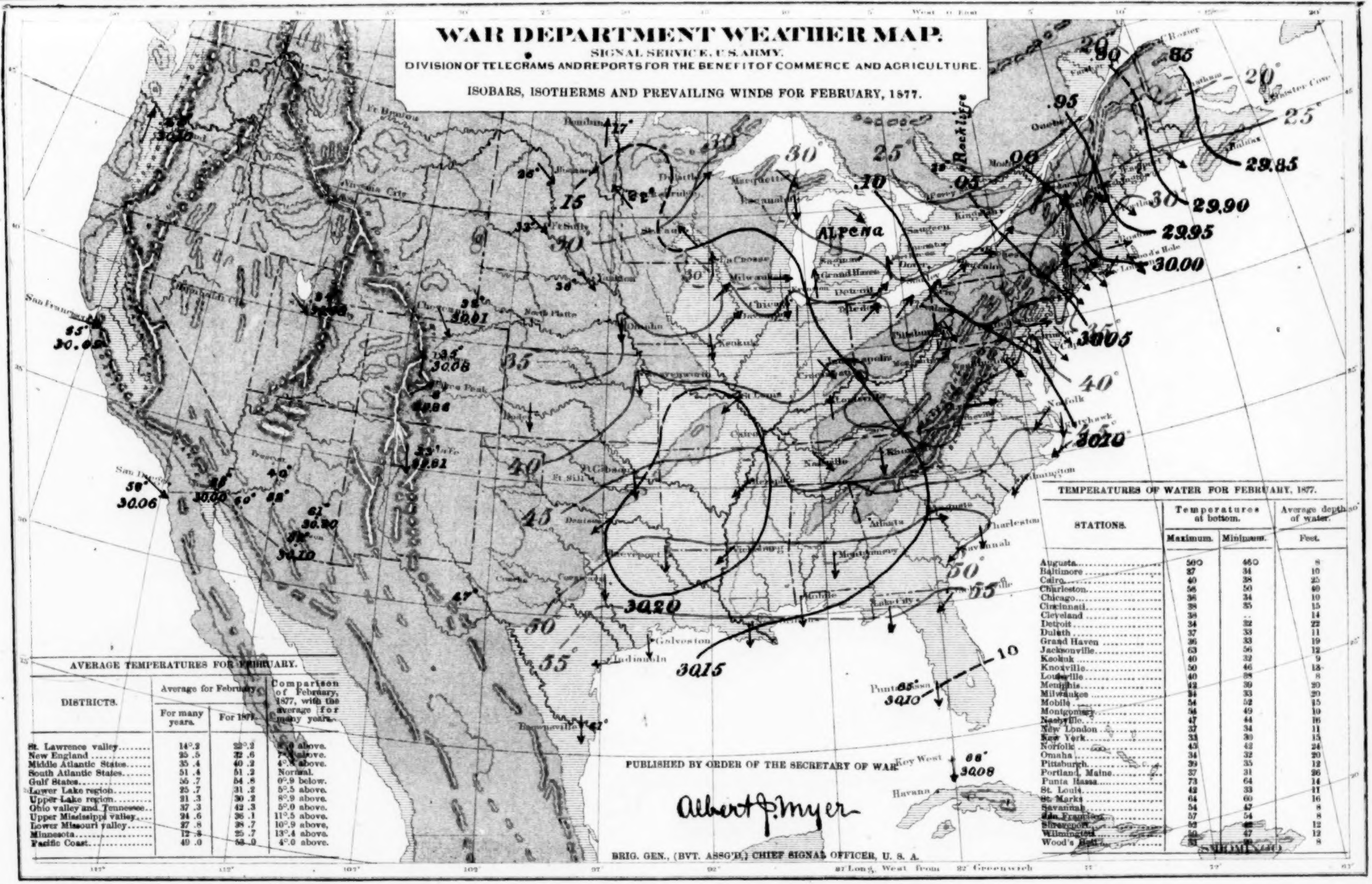
Albert J. Myer

BRIG. GEN., (BVT. ASS'G'D,) CHIEF SIGNAL OFFICER, U. S. A.

WAR DEPARTMENT WEATHER MAP.

SIGNAL SERVICE, U.S. ARMY.
DIVISION OF TELEGRAMS AND REPORTS FOR THE BENEFIT OF COMMERCE AND AGRICULTURE.

ISOBARS, ISOTHERMS AND PREVAILING WINDS FOR FEBRUARY, 1877.



29.85
29.90
29.95
30.00
30.05
30.10
30.15
30.20
20°
25°
30°
35
40°
45
50
55
.95
.90
.85
.00
.05
.10
Rockliffe
Alpena
15
10
30.06
30.00
30.01
30.08
29.94
29.91
30.10
30.20
30.08
30.10
San Francisco
San Diego
Galveston
Indianola
Brownsville
Key West
Havana
Punta Rassa
Charleston
Savannah
Wilmington
Norfolk
Chicago
Milwaukee
La Crosse
Keokuk
Duluth
Marquette
Escanaba
Grand Haven
Detroit
Toledo
Pittsburgh
Knoxville
Nashville
Cairo
Shreveport
Vicksburg
Mobile
Montgomery
Atlanta
Omaha
North Platte
Denison
Fort Sill
Santa Fe
Pike's Peak
Cheyenne
Virginia City
Fort Benton
Pembina
Quebec
Montreal
Kingston
Saugeen
Halifax
Wood's Hole
Indianola
West 0 East
117°
112°
107°
102°
97°
92°
87 Long. West from 82 Greenwich
77
72°
67°

AVERAGE TEMPERATURES FOR FEBRUARY.

DISTRICTS.	Average for February.		Comparison of February, 1877, with the average for many years.
	For many years.	For 1877.	
St. Lawrence valley	14°.2	22°.2	8°.0 above.
New England	25 .5	32 .6	7°.[illegible] above.
Middle Atlantic States	35 .4	40 .2	4°.[illegible] above.
South Atlantic States	51 .4	51 .2	Normal.
Gulf States	56 .7	54 .8	0°.9 below.
Lower Lake region	25 .7	31 .2	5°.5 above.
Upper Lake region	21 .3	30 .2	8°.9 above.
Ohio valley and Tennessee	37 .3	42 .3	5°.0 above.
Upper Mississippi valley	24 .6	36 .1	11°.5 above.
Lower Missouri valley	27 .8	38 .7	10°.9 above,
Minnesota	12 .3	25 .7	13°.4 above.
Pacific Coast	49 .0	53 .0	4°.0 above.

TEMPERATURES OF WATER FOR FEBRUARY, 1877.

STATIONS.	Temperatures at bottom.		Average depth of water.
	Maximum.	Minimum.	Feet.
Augusta	50°	46°	8
Baltimore	37	34	10
Cairo	40	38	25
Charleston	56	50	40
Chicago	36	34	10
Cincinnati	38	35	15
Cleveland	38	..	14
Detroit	34	32	22
Duluth	37	33	11
Grand Haven	36	33	19
Jacksonville	63	56	12
Keokuk	40	32	9
Knoxville	50	46	18
Louisville	40	38	8
Memphis	42	39	20
Milwaukee	34	33	20
Mobile	54	52	15
Montgomery	54	49	10
Nashville	47	44	16
New London	37	34	11
New York	33	30	15
Norfolk	45	42	24
Omaha	34	32	20
Pittsburgh	39	35	12
Portland, Maine	37	31	26
Punta Rassa	73	64	14
St. Louis	42	33	11
St. Marks	64	60	16
Savannah	54	47	8
San Francisco	57	54	8
Shreveport	52	[illegible]	12
Wilmington	50	47	12
Wood's Hole	[illegible]	[illegible]	8

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Albert J. Myer

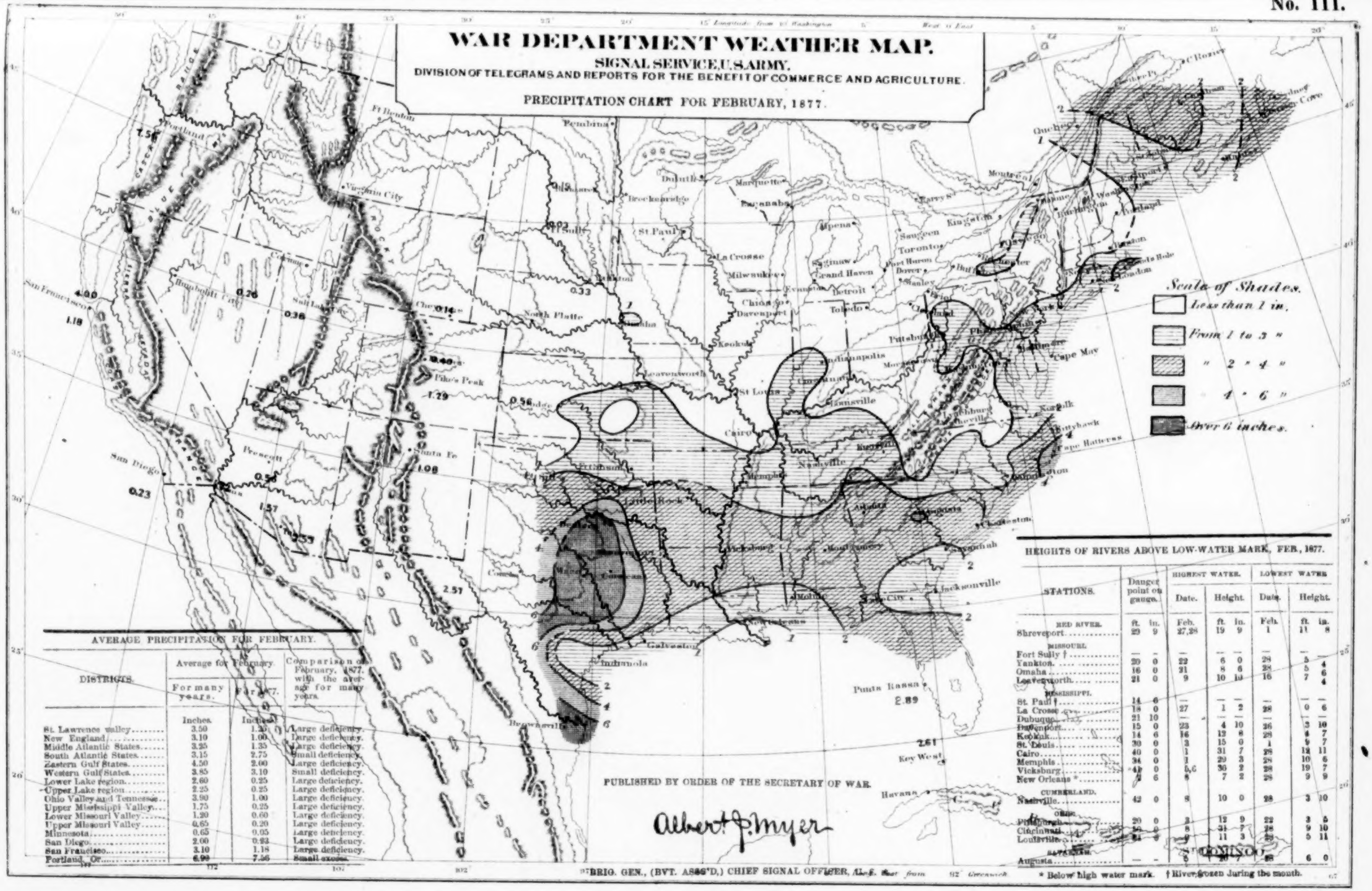
BRIG. GEN., (BVT. ASSG'D,) CHIEF SIGNAL OFFICER, U. S. A.

No. III.

WAR DEPARTMENT WEATHER MAP.

SIGNAL SERVICE, U.S. ARMY.
DIVISION OF TELEGRAMS AND REPORTS FOR THE BENEFIT OF COMMERCE AND AGRICULTURE.

PRECIPITATION CHART FOR FEBRUARY, 1877.


Scale of Shades.
Less than 1 in.
From 1 to 3 "
" 2 " 4 "
" 4 " 6 "
Over 6 inches.
Portland
7.56
San Francisco
4.00
1.18
Virginia City
Humboldt City
0.26
Salt Lake
0.38
Cheyenne
0.14
Pike's Peak
1.29
0.40
Santa Fe
1.08
Prescott
0.56
San Diego
0.23
1.57
2.57
North Platte
0.33
0.02
Ft Sully
0.19
Bismarck
Ft Benton
Pembina
Duluth
Breckenridge
St Paul
Marquette
Escanaba
La Crosse
Milwaukee
Chicago
Davenport
Keokuk
Leavenworth
0.56
St Louis
Cairo
Indianapolis
Cincinnati
Evansville
Nashville
Memphis
Little Rock
Vicksburg
Montgomery
Atlanta
Augusta
Mobile
New Orleans
Galveston
Indianola
Brownsville
Alpena
Saugeen
Toronto
Kingston
Port Huron
Grand Haven
Detroit
Toledo
Cleveland
Pittsburgh
Buffalo
Oswego
Montreal
Quebec
Burlington
Portland
Boston
Albany
New York
Philadelphia
Baltimore
Washington
Cape May
Norfolk
Kittyhawk
Cape Hatteras
Wilmington
Charleston
Savannah
Jacksonville
Cedar Keys
Punta Rassa
2.89
Key West
2.61
Havana
St. DOMINGO
1
2
4
6
West from 92° Greenwich

AVERAGE PRECIPITATION FOR FEBRUARY.

DISTRICTS.	Average for February.		Comparison of February, 1877, with the average for many years.
	For many years.	For 1877.	
	Inches.	Inches.	
St. Lawrence valley	3.50	1.25	Large deficiency.
New England	3.10	1.00	Large deficiency.
Middle Atlantic States	3.25	1.35	Large deficiency.
South Atlantic States	3.15	2.75	Small deficiency.
Eastern Gulf States	4.50	2.00	Large deficiency.
Western Gulf States	3.85	3.10	Small deficiency.
Lower Lake region	2.60	0.25	Large deficiency.
Upper Lake region	2.25	0.25	Large deficiency.
Ohio Valley and Tennessee	3.90	1.00	Large deficiency.
Upper Mississippi Valley	1.75	0.25	Large deficiency.
Lower Missouri Valley	1.20	0.60	Large deficiency.
Upper Missouri Valley	0.65	0.20	Large deficiency.
Minnesota	0.65	0.05	Large deficiency.
San Diego	2.00	0.23	Large deficiency.
San Francisco	3.10	1.18	Large deficiency.
Portland, Or	6.90	7.56	Small excess.

HEIGHTS OF RIVERS ABOVE LOW-WATER MARK, FEB., 1877.

STATIONS.	Danger point on gauge.		HIGHEST WATER.			LOWEST WATER.		
			Date.	Height.		Date.	Height.	
	ft.	in.	Feb.	ft.	in.	Feb.	ft.	in.
RED RIVER.								
Shreveport	29	9	27,28	19	9	1	11	8
MISSOURI.								
Fort Sully †	—	—	—	—	—	—	—	—
Yankton	20	0	22	6	0	28	5	4
Omaha	16	0	21	8	6	28	5	6
Leavenworth	21	0	9	10	10	16	7	4
MISSISSIPPI.								
St. Paul †	14	6	—	—	—	—	—	—
La Crosse	18	0	27	1	2	28	0	6
Dubuque	21	10	—	—	—	—	—	—
Davenport	15	0	23	4	10	26	3	10
Keokuk	14	6	16	12	8	28	4	7
St. Louis	30	0	3	15	0	1	9	7
Cairo	40	0	1	31	7	28	12	11
Memphis	34	0	1	29	3	28	10	6
Vicksburg	41	0	5,6	36	2	28	19	7
New Orleans *	[illegible]	6	6	7	2	28	9	9
CUMBERLAND.								
Nashville	42	0	8	10	0	28	3	10
OHIO.								
Pittsburgh	20	0	3	12	9	22	3	5
Cincinnati	50	0	8	31	7	28	9	10
Louisville	24	0	9	11	3	28	5	11
SAVANNAH.								
Augusta	—	—	5	20	7	28	6	0

* Below high water mark. † River frozen during the month.

PUBLISHED BY ORDER OF THE SECRETARY OF WAR.

Albert J. Myer

BRIG. GEN., (BVT. ASSG'D,) CHIEF SIGNAL OFFICER, U. S. A.

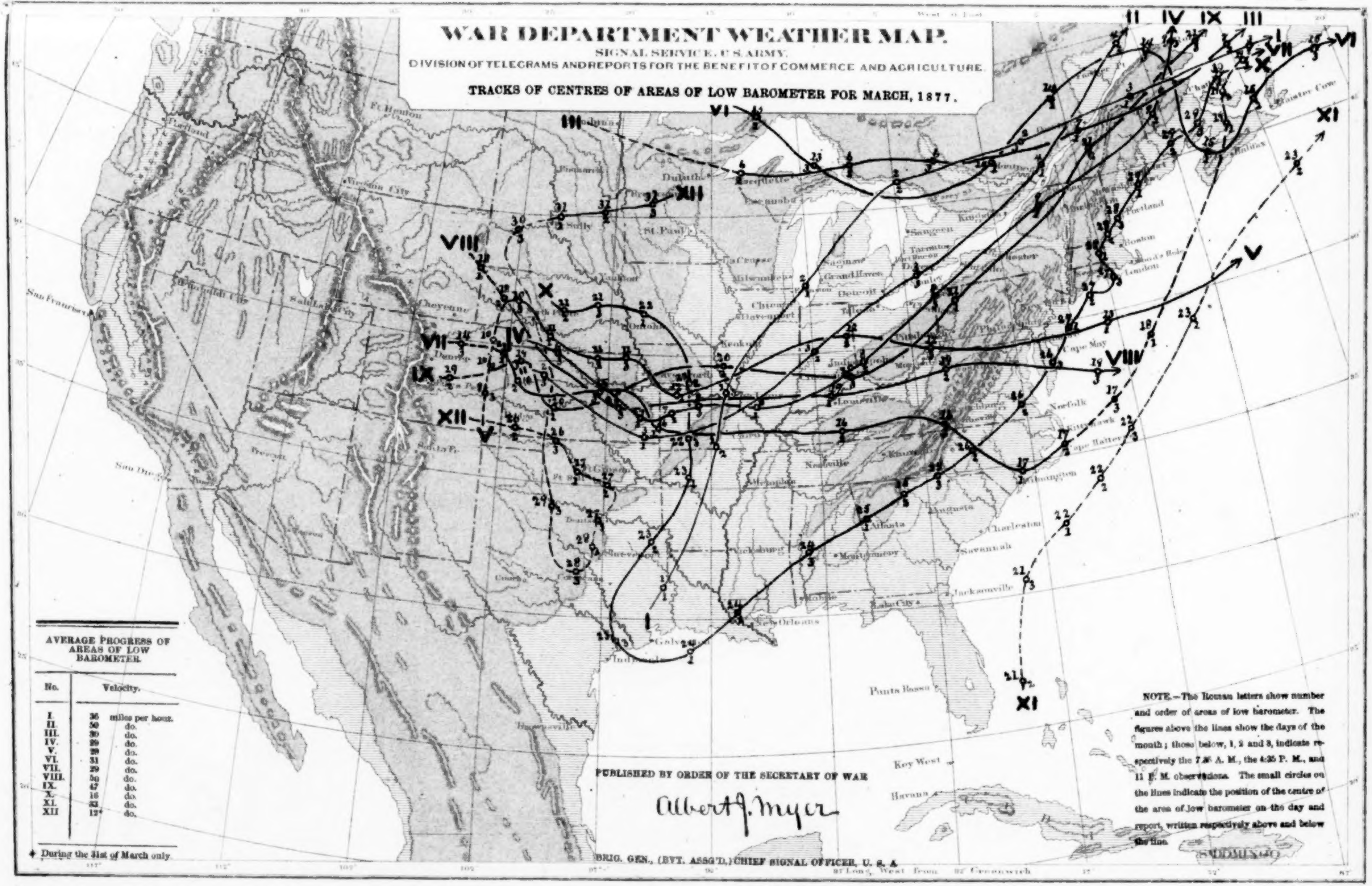
No. I.

WAR DEPARTMENT WEATHER MAP.

SIGNAL SERVICE, U.S. ARMY.

DIVISION OF TELEGRAMS AND REPORTS FOR THE BENEFIT OF COMMERCE AND AGRICULTURE.

TRACKS OF CENTRES OF AREAS OF LOW BAROMETER FOR MARCH, 1877.


I
II
III
IV
V
VI
VII
VIII
IX
X
XI
XII
San Francisco
San Diego
Portland
Ft. Benton
Virginia City
Salt Lake City
Cheyenne
Denver
Santa Fe
Duluth
St. Paul
Sully
Omaha
La Crosse
Milwaukee
Chicago
Davenport
Grand Haven
Detroit
Keokuk
Louisville
Nashville
Memphis
Vicksburg
Shreveport
Galveston
Indianola
New Orleans
Mobile
Montgomery
Atlanta
Augusta
Charleston
Savannah
Jacksonville
Cedar Keys
Punta Rassa
Key West
Havana
Wilmington
Cape Hatteras
Norfolk
Cape May
Boston
Portland
Halifax
Escanaba
Marquette
Saugeen
Kingston
Toronto
New London
Cape Breton
Canso
Bismarck
Fort Gibson
Denison
Corsicana
Brownsville
Preston
West from Greenwich

No.	Velocity.
I.	36 miles per hour.
II.	50 do.
III.	30 do.
IV.	29 do.
V.	29 do.
VI.	31 do.
VII.	29 do.
VIII.	50 do.
IX.	47 do.
X.	16 do.
XI.	33 do.
XII	12◆ do.

◆ During the 31st of March only.

Table title: AVERAGE PROGRESS OF AREAS OF LOW BAROMETER.

NOTE.—The Roman letters show number and order of areas of low barometer. The figures above the lines show the days of the month; those below, 1, 2 and 3, indicate respectively the 7.35 A. M., the 4:35 P. M., and 11 P. M. observations. The small circles on the lines indicate the position of the centre of the area of low barometer on the day and report, written respectively above and below the line.

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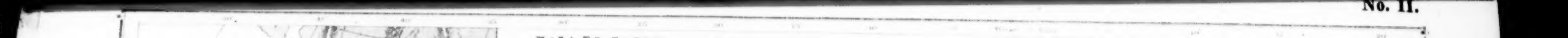
Albert J. Myer

BRIG. GEN., (BVT. ASSG'D,) CHIEF SIGNAL OFFICER, U. S. A.

No. II.



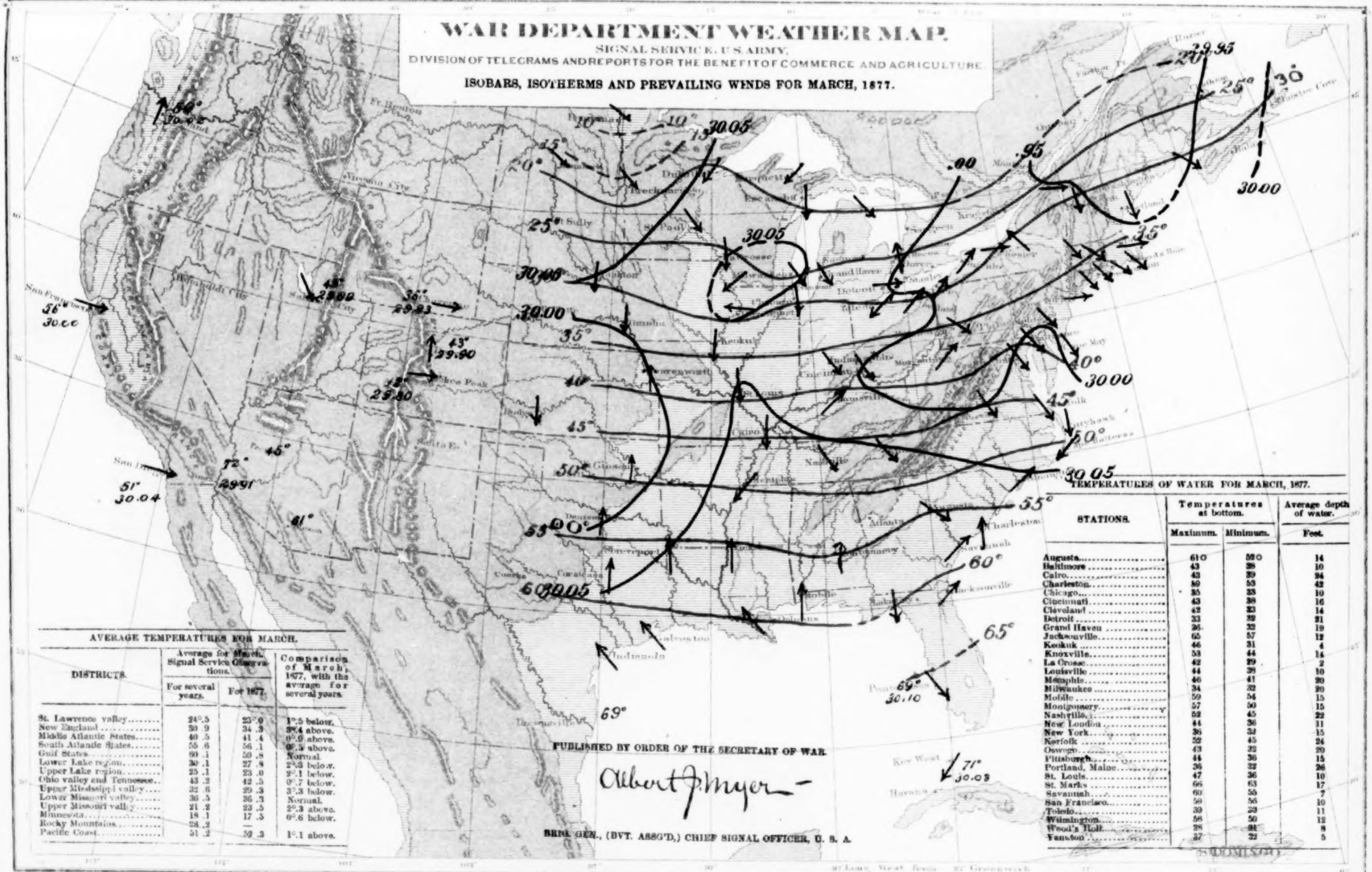
No. II.

WAR DEPARTMENT WEATHER MAP.

SIGNAL SERVICE, U.S. ARMY,

DIVISION OF TELEGRAMS AND REPORTS FOR THE BENEFIT OF COMMERCE AND AGRICULTURE.

ISOBARS, ISOTHERMS AND PREVAILING WINDS FOR MARCH, 1877.


20°
29.95
25°
30°
30.00
35°
.95
.00
30.05
10°
10°
15°
15°
20°
25°
30.05
30.00
30.00
35°
40°
45°
50°
55°
60°
30.05
40°
30.00
45°
50°
30.05
55°
60°
65°
69°
30.10
71°
30.03
69°
50°
30.00
56°
30.00
35°
29.83
45°
29.90
43°
29.90
42°
29.80
51°
30.04
72°
29.91
45°
41°

AVERAGE TEMPERATURES FOR MARCH.

DISTRICTS.	Average for March, Signal Service Observations.		Comparison of March, 1877, with the average for several years.
	For several years.	For 1877.	
St. Lawrence valley	24°.5	23°.0	1°.5 below.
New England	30 .9	34 .3	3°.4 above.
Middle Atlantic States	40 .5	41 .4	0°.9 above.
South Atlantic States	55 .6	56 .1	0°.5 above.
Gulf States	60 .1	59 .8	Normal.
Lower Lake region	30 .1	27 .8	2°.3 below.
Upper Lake region	25 .1	23 .0	2°.1 below.
Ohio valley and Tennessee	43 .2	42 .5	0°.7 below.
Upper Mississippi valley	32 .6	29 .3	3°.3 below.
Lower Missouri valley	36 .5	36 .3	Normal.
Upper Missouri valley	21 .2	23 .5	2°.3 above.
Minnesota	18 .1	17 .5	0°.6 below.
Rocky Mountains	28 .2	—	
Pacific Coast	51 .2	52 .3	1°.1 above.

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Albert J. Myer

BRIG. GEN., (BVT. ASSG'D,) CHIEF SIGNAL OFFICER, U. S. A.

TEMPERATURES OF WATER FOR MARCH, 1877.

STATIONS.	Temperatures at bottom.		Average depth of water.
	Maximum.	Minimum.	Feet.
Augusta	61°	58°	14
Baltimore	43	38	10
Cairo	43	39	24
Charleston	60	53	42
Chicago	35	33	10
Cincinnati	43	38	16
Cleveland	42	33	14
Detroit	33	32	21
Grand Haven	36	32	19
Jacksonville	65	57	12
Keokuk	46	31	4
Knoxville	53	44	14
La Crosse	42	29	2
Louisville	44	38	10
Memphis	46	41	20
Milwaukee	34	32	20
Mobile	59	54	15
Montgomery	57	50	15
Nashville	52	45	22
New London	44	36	11
New York	36	32	15
Norfolk	52	45	24
Oswego	43	32	20
Pittsburgh	44	36	15
Portland, Maine	36	32	26
St. Louis	47	36	10
St. Marks	66	63	17
Savannah	60	55	7
San Francisco	59	56	10
Toledo	39	29	11
Wilmington	58	50	12
Wood's Holl	38	31	8
Yankton	37	32	5

No. III.

15° Longitude from W. Washington
West 0 East

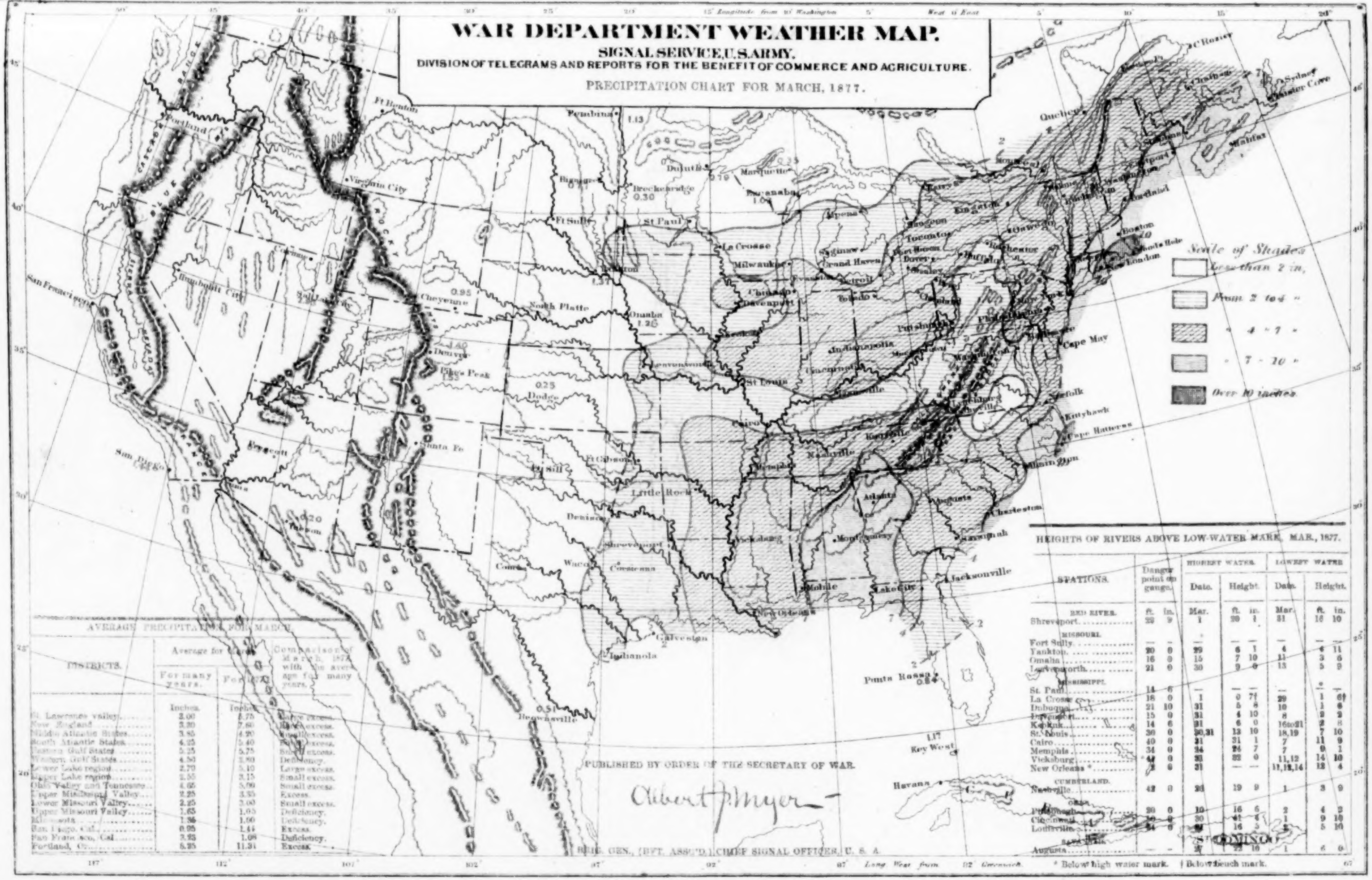
No. III.

WAR DEPARTMENT WEATHER MAP.

SIGNAL SERVICE, U.S. ARMY.

DIVISION OF TELEGRAMS AND REPORTS FOR THE BENEFIT OF COMMERCE AND AGRICULTURE.

PRECIPITATION CHART FOR MARCH, 1877.


Scale of Shades
Less than 2 in.
From 2 to 4 "
" 4 " 7 "
" 7 - 10 "
Over 10 inches.
Ft Benton
Pembina
Duluth
Marquette
Escanaba
Breckenridge
Bismarck
Virginia City
Portland
Corinne
Salt Lake City
Humboldt City
San Francisco
Cheyenne
North Platte
Omaha
Denver
Pikes Peak
Dodge
Santa Fe
Prescott
San Diego
Tucson
Ft Sill
Ft Gibson
Little Rock
Denison
Shreveport
Corsicana
Waco
Galveston
Indianola
Brownsville
Ft Sully
St Paul
La Crosse
Milwaukee
Chicago
Davenport
Keokuk
Leavenworth
St Louis
Cairo
Memphis
Nashville
Vicksburg
New Orleans
Mobile
Montgomery
Atlanta
Augusta
Savannah
Charleston
Jacksonville
Lake City
Punta Rassa
Key West
Havana
Alpena
Saginaw
Grand Haven
Detroit
Toledo
Port Huron
Dover
Buffalo
Rochester
Oswego
Kingston
Toronto
Cleveland
Pittsburgh
Indianapolis
Cincinnati
Louisville
Knoxville
Lynchburg
Norfolk
Kittyhawk
Cape Hatteras
Wilmington
Philadelphia
New York
Cape May
Boston
New London
Portland
Montreal
Quebec
Halifax
Sydney
Chatham
C. Rozier
St Domingo
ROCKY
SIERRA NEVADA
BLUE
CASCADE RANGE
0.95
1.40
1.35
0.25
1.26
0.30
0.79
0.35
1.04
1.13
0.51
0.20
0.84
1.17
15° Longitude from Washington
West
East
Long West from Greenwich

AVERAGE PRECIPITATION FOR MARCH.

DISTRICTS.	Average for March: For many years.	Average for March: For 1877.	Comparison of March, 1877, with the average for many years.
	Inches.	Inches.	
St. Lawrence valley	2.00	5.75	Large excess.
New England	3.20	7.60	Large excess.
Middle Atlantic States	3.85	4.20	Small excess.
South Atlantic States	4.25	5.40	Small excess.
Eastern Gulf States	5.25	5.75	Small excess.
Western Gulf States	4.50	3.80	Deficiency.
Lower Lake region	2.70	5.10	Large excess.
Upper Lake region	2.55	3.15	Small excess.
Ohio Valley and Tennessee	4.65	5.00	Small excess.
Upper Mississippi Valley	2.25	3.35	Excess.
Lower Missouri Valley	2.25	3.00	Small excess.
Upper Missouri Valley	1.65	1.05	Deficiency.
Minnesota	1.36	1.00	Deficiency.
San Diego, Cal.	0.95	1.44	Excess.
San Francisco, Cal.	3.15	1.08	Deficiency.
Portland, Or.	5.25	11.31	Excess.

HEIGHTS OF RIVERS ABOVE LOW-WATER MARK, MAR., 1877.

STATIONS.	Danger point on gauge.		HIGHEST WATER. Date.	HIGHEST WATER. Height.		LOWEST WATER. Date.	LOWEST WATER. Height.	
	ft.	in.	Mar.	ft.	in.	Mar.	ft.	in.
RED RIVER.								
Shreveport	29	9	1	20	1	31	16	10
MISSOURI.								
Fort Sully	—	—	—	—	—	—	—	—
Yankton	20	0	29	6	1	4	4	11
Omaha	16	0	15	7	10	11	3	6
Leavenworth	21	0	30	9	6	13	5	9
MISSISSIPPI.								
St. Paul	14	6	—	—	—	—	—	—
La Crosse	18	0	1	0	7†	29	1	6†
Dubuque	21	10	31	5	8	10	1	6
Davenport	15	0	31	4	10	8	2	2
Keokuk	14	6	31	6	0	16 to 21	2	8
St. Louis	30	0	30,31	13	10	18,19	7	10
Cairo	40	0	31	31	1	7	11	9
Memphis	34	0	24	24	7	7	9	1
Vicksburg	41	0	31	32	0	11,12	14	10
New Orleans *	2	6	31	—	—	11,12,14	12	4
CUMBERLAND.								
Nashville	42	0	24	19	9	1	3	9
OHIO.								
Pittsburgh	20	0	10	16	6	2	4	3
Cincinnati	[illegible]	0	30	41	6	1	9	10
Louisville	24	0	[illegible]	16	5	2	5	10
SAVANNAH.								
Augusta	—	—	[illegible]	22	10	1	6	6

* Below high water mark. † Below bench mark.

PUBLISHED BY ORDER OF THE SECRETARY OF WAR.

Albert J. Myer

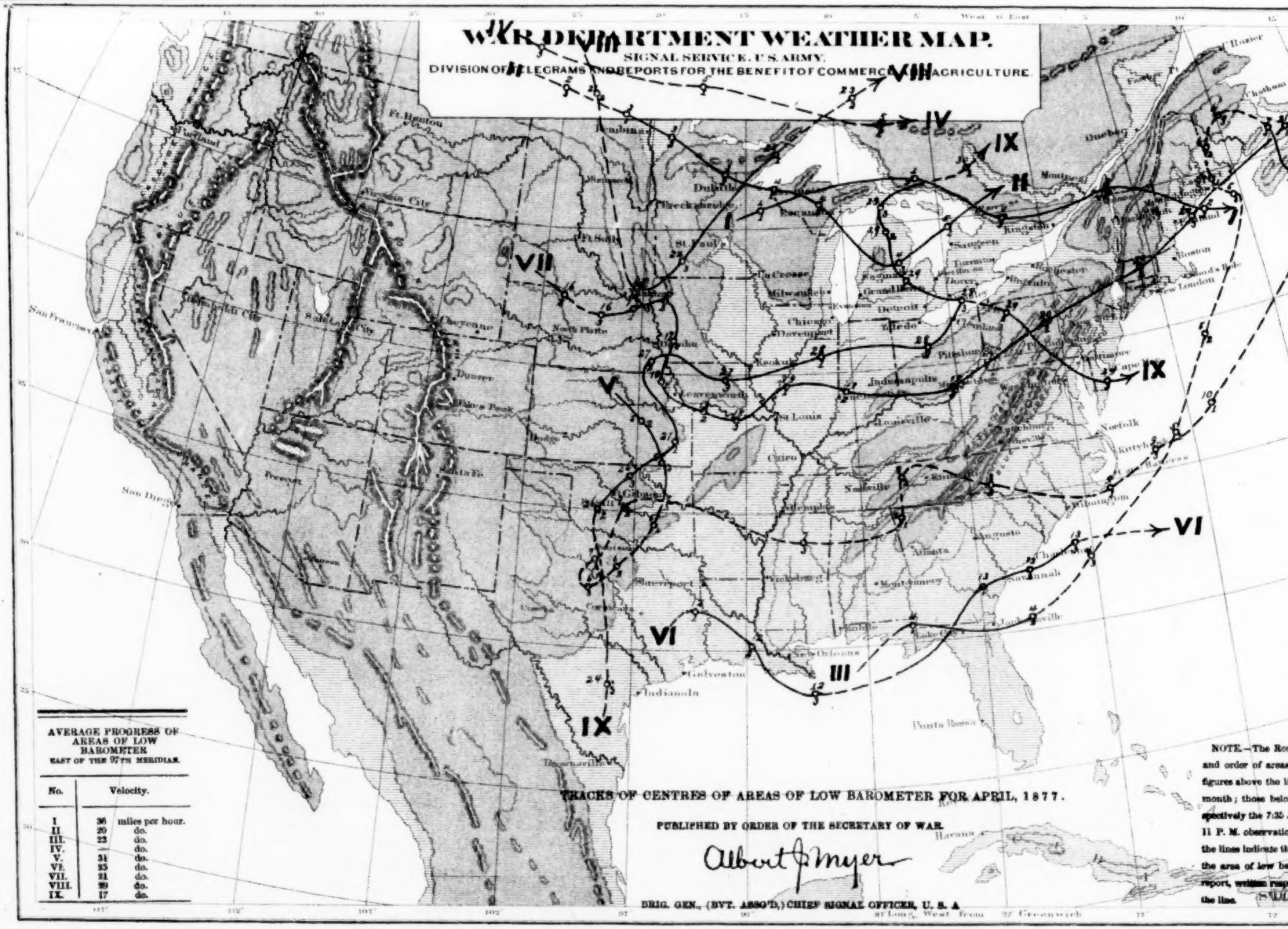
BRIG. GEN., (BVT. ASSG'D.) CHIEF SIGNAL OFFICER, U. S. A.

No. I.

No. I.

WAR DEPARTMENT WEATHER MAP.

SIGNAL SERVICE, U.S. ARMY.
DIVISION OF TELEGRAMS AND REPORTS FOR THE BENEFIT OF COMMERCE AND AGRICULTURE.


I
II
III
IV
V
VI
VII
VIII
IX
San Francisco
San Diego
Portland
Ft. Benton
Virginia City
Salt Lake City
Cheyenne
Denver
Pikes Peak
Santa Fe
Prescott
North Platte
Pembina
Breckenridge
Duluth
Escanaba
St. Paul
La Crosse
Milwaukee
Chicago
Davenport
Keokuk
Leavenworth
Omaha
St. Louis
Cairo
Louisville
Indianapolis
Detroit
Toledo
Cleveland
Pittsburgh
Saugeen
Toronto
Kingston
Montreal
Quebec
Boston
New London
Norfolk
Kitty Hawk
Hatteras
Wilmington
Charleston
Savannah
Augusta
Atlanta
Montgomery
Nashville
Knoxville
Memphis
Vicksburg
Shreveport
New Orleans
Mobile
Cedar Keys
Jacksonville
Punta Rassa
Key West
Havana
Galveston
Indianola
Brownsville
Halifax
Chatham
S. DOMINGO
West 0 East
Long. West from Greenwich

TRACKS OF CENTRES OF AREAS OF LOW BAROMETER FOR APRIL, 1877.

PUBLISHED BY ORDER OF THE SECRETARY OF WAR.

Albert J. Myer

BRIG. GEN., (BVT. ASSO'D,) CHIEF SIGNAL OFFICER, U. S. A.

AVERAGE PROGRESS OF AREAS OF LOW BAROMETER EAST OF THE 97TH MERIDIAN.

No.	Velocity.	
I	36	miles per hour.
II.	20	do.
III.	23	do.
IV.	—	do.
V.	31	do.
VI.	25	do.
VII.	21	do.
VIII.	20	do.
IX.	17	do.

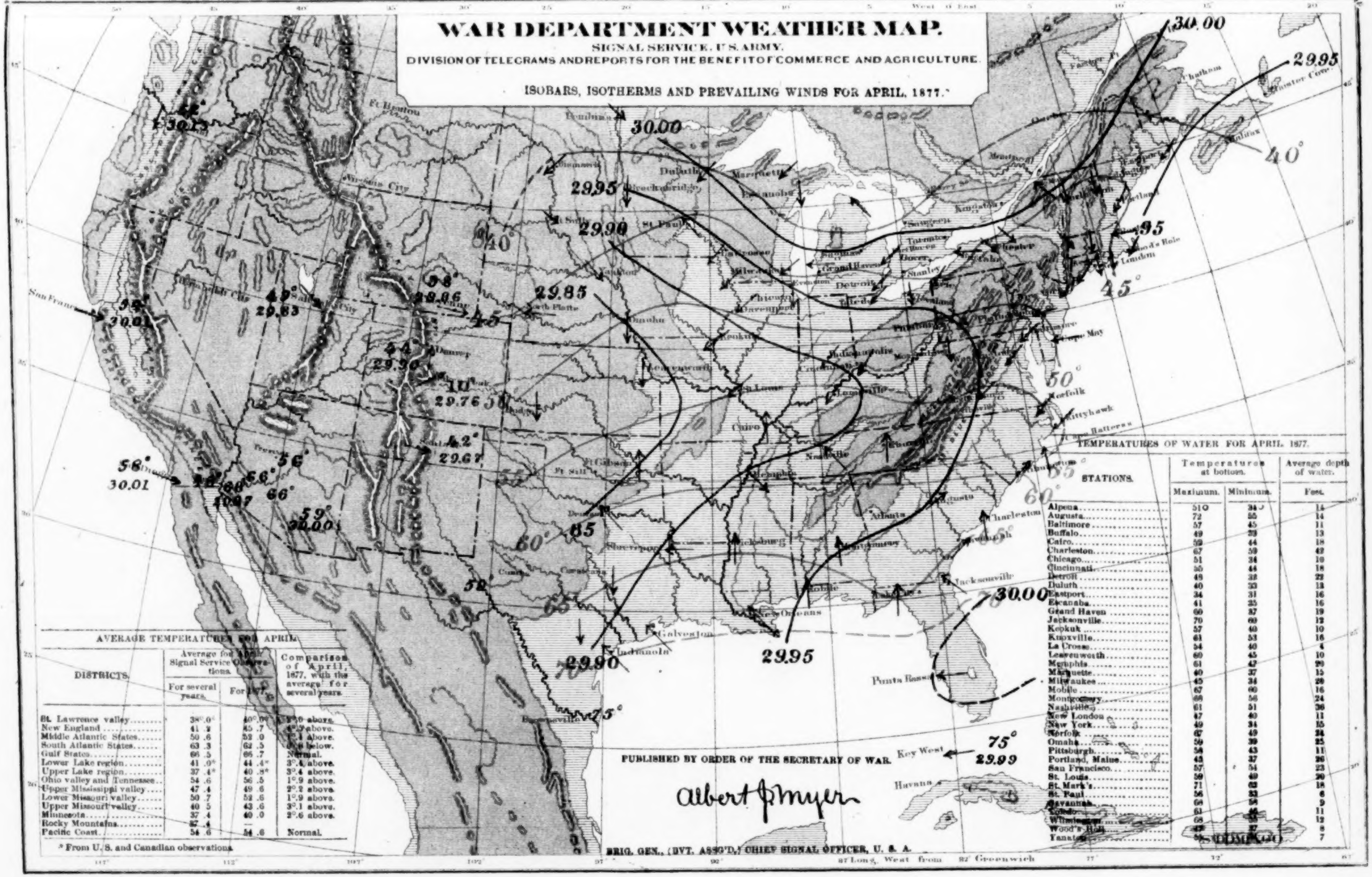
NOTE.—The Roman letters show number and order of areas of low barometer. The figures above the lines show the days of the month; those below, 1, 2 and 3, indicate respectively the 7:35 A. M., the 4:35 P. M., and 11 P. M. observations. The small circles on the lines indicate the position of the centre of the area of low barometer on the day and report, written respectively above and below the line.

WAR DEPARTMENT WEATHER MAP.

SIGNAL SERVICE, U.S. ARMY.

DIVISION OF TELEGRAMS AND REPORTS FOR THE BENEFIT OF COMMERCE AND AGRICULTURE.

ISOBARS, ISOTHERMS AND PREVAILING WINDS FOR APRIL, 1877.


30.00
29.95
29.90
29.85
30.13
30.01
29.83
29.06
29.30
29.76
29.67
30.00
29.99
40°
45°
50°
55°
60°
65°
70°
75°
San Francisco
Salt Lake City
Virginia City
Ft. Benton
Denver
North Platte
Omaha
Duluth
Breckenridge
Marquette
Escanaba
St. Paul
Milwaukee
Chicago
Davenport
Keokuk
Grand Haven
Detroit
Toledo
Cleveland
Buffalo
Rochester
Toronto
Kingston
Montreal
Chatham
Halifax
Eastport
Portland
Boston
Wood's Hole
New London
Cape May
Norfolk
Kittyhawk
Cape Hatteras
Wilmington
Charleston
Savannah
Jacksonville
Punta Rassa
Key West
Havana
St. Louis
Cairo
Nashville
Memphis
Knoxville
Atlanta
Augusta
Montgomery
Mobile
New Orleans
Vicksburg
Shreveport
Galveston
Indianola
Brownsville
Ft. Sill
Ft. Gibson
Denison
Leavenworth
Yankton
Pembina
West 0 East
Long. West from Greenwich
117°
112°
107°
102°
97°
92°
87°
82°
77°
72°
67°

AVERAGE TEMPERATURES FOR APRIL.			
DISTRICTS.	Average for April Signal Service Observations.		Comparison of April, 1877, with the average for several years.
	For several years.	For 1877.	
St. Lawrence valley	38°.0*	40°.0*	2°.0 above.
New England	41 .2	45 .7	4°.5 above.
Middle Atlantic States	50 .6	52 .0	1°.4 above.
South Atlantic States	63 .3	62 .5	0°.8 below.
Gulf States	66 .5	66 .7	Normal.
Lower Lake region	41 .0*	44 .4*	3°.4 above.
Upper Lake region	37 .4*	40 .8*	3°.4 above.
Ohio valley and Tennessee	54 .6	56 .5	1°.9 above.
Upper Mississippi valley	47 .4	49 .6	2°.2 above.
Lower Missouri valley	50 .7	52 .6	1°.9 above.
Upper Missouri valley	40 .5	43 .6	3°.1 above.
Minnesota	37 .4	40 .0	2°.6 above.
Rocky Mountains	37 .4	—	
Pacific Coast	54 .6	54 .6	Normal.

* From U. S. and Canadian observations.

TEMPERATURES OF WATER FOR APRIL, 1877.			
STATIONS.	Temperatures at bottom.		Average depth of water.
	Maximum.	Minimum.	Feet.
Alpena	51	34	14
Augusta	72	55	14
Baltimore	57	45	11
Buffalo	49	33	13
Cairo	59	44	18
Charleston	67	59	42
Chicago	51	34	10
Cincinnati	55	44	18
Detroit	48	38	22
Duluth	40	33	13
Eastport	34	31	16
Escanaba	41	25	16
Grand Haven	60	37	19
Jacksonville	70	60	12
Keokuk	57	40	10
Knoxville	61	53	16
La Crosse	54	40	4
Leavenworth	60	45	10
Memphis	61	42	20
Marquette	40	37	15
Milwaukee	45	34	20
Mobile	67	60	16
Montgomery	68	56	24
Nashville	61	51	36
New London	47	40	11
New York	49	34	15
Norfolk	67	49	24
Omaha	59	39	25
Pittsburgh	56	43	11
Portland, Maine	43	37	26
San Francisco	57	54	23
St. Louis	59	40	20
St. Mark's	71	62	18
St. Paul	56	53	6
Savannah	68	58	9
Toledo	61	46	11
Wilmington	68	55	12
Wood's Holl	42	37	8
Yankton	56	[illegible]	7

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No. III.

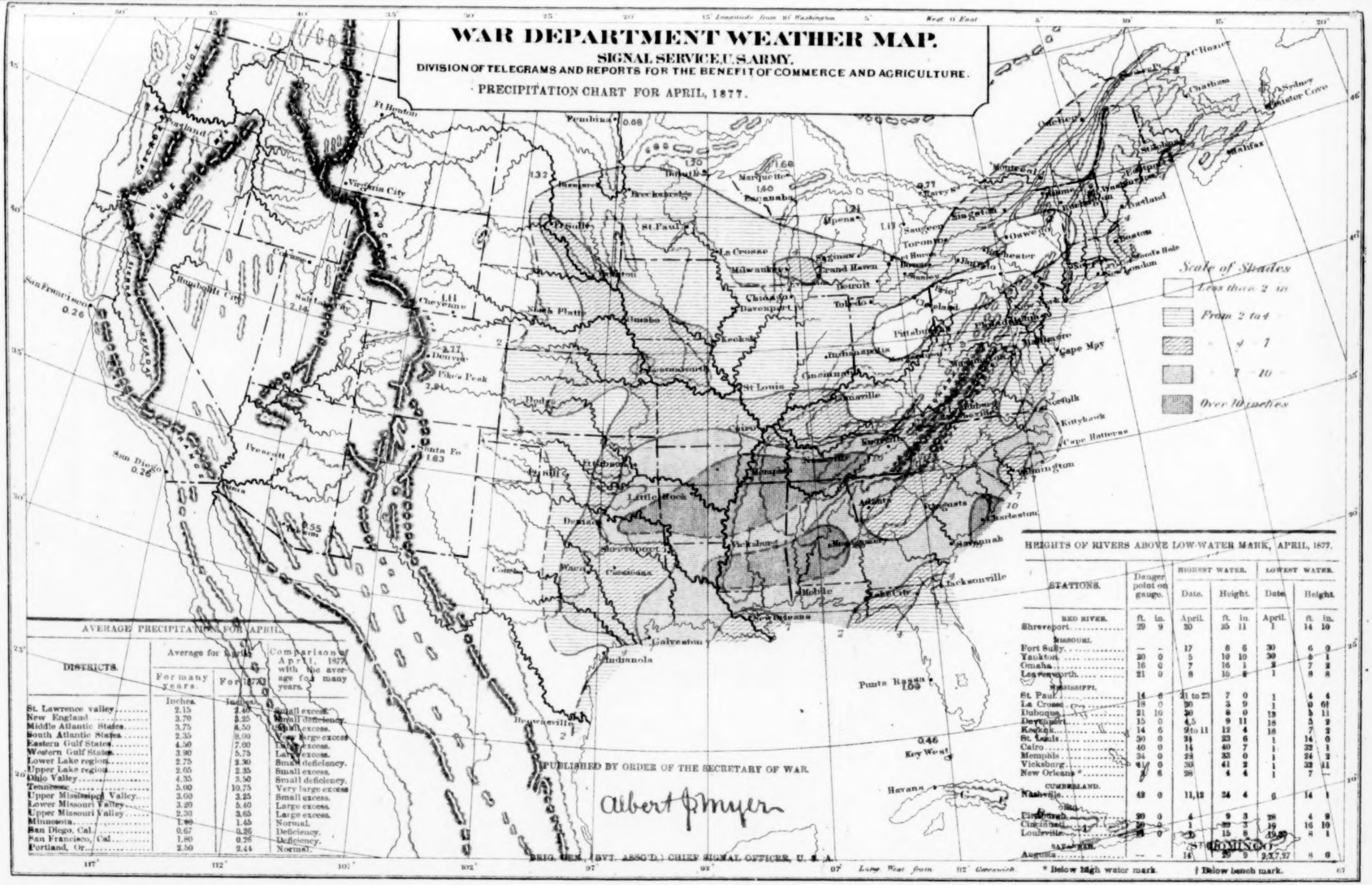
20°
15
10
5
West 0 East
5°
15° Longitude from W. Washington
20
25
30
35

WAR DEPARTMENT WEATHER MAP.

SIGNAL SERVICE, U.S. ARMY.

DIVISION OF TELEGRAMS AND REPORTS FOR THE BENEFIT OF COMMERCE AND AGRICULTURE.

PRECIPITATION CHART FOR APRIL, 1877.


Scale of Shades
Less than 2 in
From 2 to 4
" 4 " 7
" 7 " 10
Over 10 inches
15° Longitude from W. Washington
West 0 East
Long. West from Greenwich
Ft Benton
Pembina 0.68
Virginia City
Cheyenne 1.11
Denver 2.77
Pike's Peak 2.94
Santa Fe 1.63
Salt Lake City 2.14
Humboldt City
Prescott
San Francisco 0.26
San Diego 0.26
Portland
North Platte
Omaha
Dodge
St Paul
Breckenridge
Duluth 1.20
Marquette 1.68
Escanaba 1.40
Alpena
La Crosse
Milwaukee
Grand Haven
Saginaw
Detroit
Toledo
Chicago
Davenport
Keokuk
St Louis
Cincinnati
Indianapolis
Evansville
Cairo
Memphis
Nashville
Little Rock
Vicksburg
Shreveport
Mobile
New Orleans
Galveston
Indianola
Brownsville
Denison
Corsicana
Atlanta
Augusta
Savannah
Charleston
Jacksonville
Punta Rassa 1.65
Key West 0.46
Havana
Wilmington
Cape Hatteras
Kittyhawk
Norfolk
Cape May
Philadelphia
Pittsburg
Cleveland
Buffalo
Rochester
Oswego
Toronto
Saugeen
Kingston
Montreal
Quebec
Boston
New London
Portland
Eastport
Halifax
Sydney
Chatham
St. Domingo
ROCKY
SIERRA NEVADA
CASCADE RANGE

AVERAGE PRECIPITATION FOR APRIL.

DISTRICTS.	Average for April.		Comparison of April, 1877, with the average for many years.
	For many years.	For 1877.	
	Inches.	Inches.	
St. Lawrence valley	2.15	2.40	Small excess.
New England	3.70	3.25	Small deficiency.
Middle Atlantic States	3.75	4.50	Small excess.
South Atlantic States	2.35	8.00	Very large excess
Eastern Gulf States	4.50	7.00	Large excess.
Western Gulf States	3.90	5.75	Large excess.
Lower Lake region	2.75	2.30	Small deficiency.
Upper Lake region	2.05	2.35	Small excess.
Ohio Valley	4.35	3.50	Small deficiency.
Tennessee	5.00	10.75	Very large excess
Upper Mississippi Valley	3.00	3.25	Small excess.
Lower Missouri Valley	3.20	5.40	Large excess.
Upper Missouri Valley	2.30	3.65	Large excess.
Minnesota	1.40	1.45	Normal.
San Diego, Cal.	0.67	0.26	Deficiency.
San Francisco, Cal.	1.80	0.26	Deficiency.
Portland, Or.	2.50	2.44	Normal.

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BRIG. GEN. (BVT. ASSG'D.) CHIEF SIGNAL OFFICER, U. S. A.

HEIGHTS OF RIVERS ABOVE LOW-WATER MARK, APRIL, 1877.

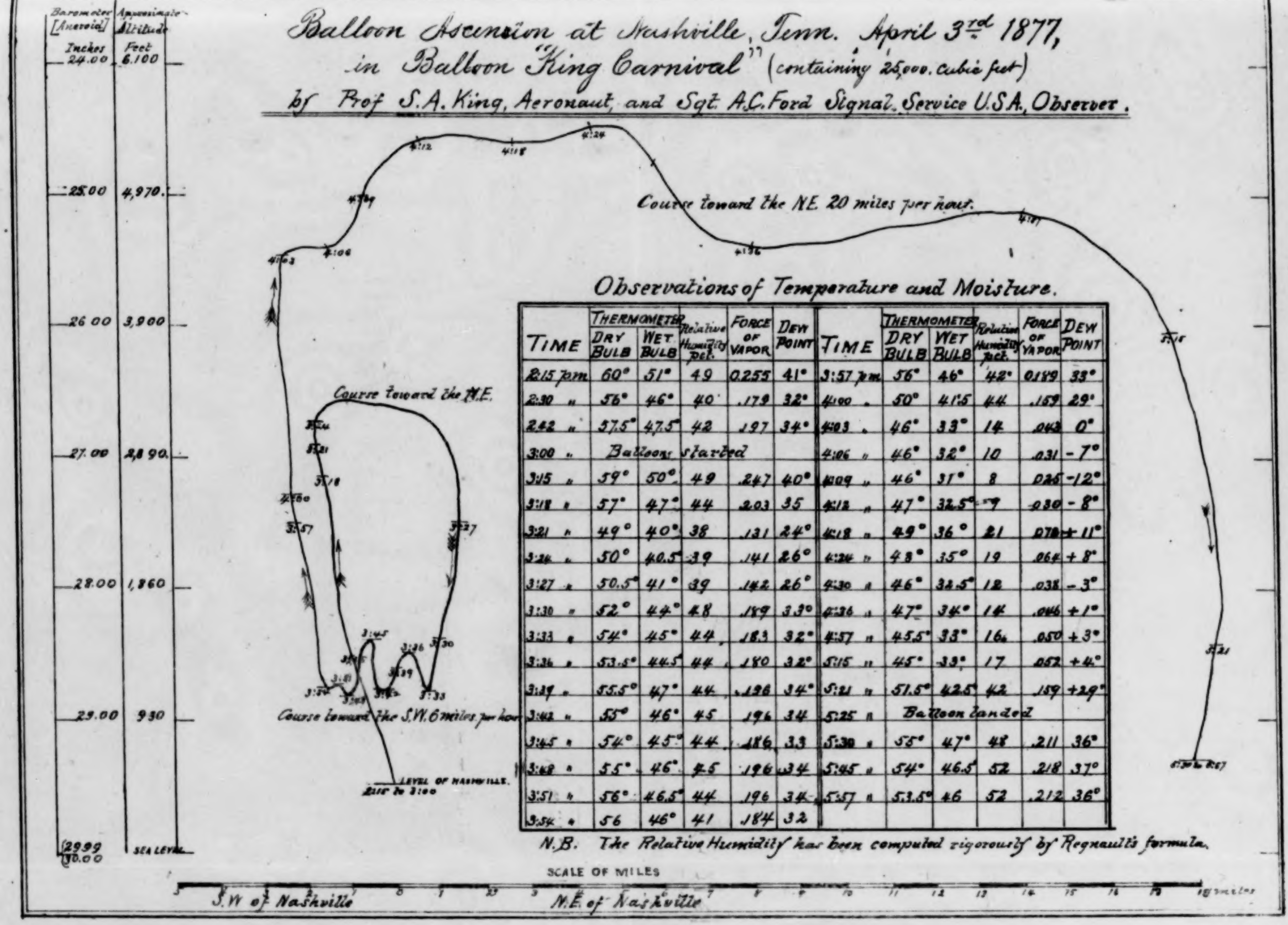
STATIONS.	Danger point on gauge.		HIGHEST WATER.			LOWEST WATER.		
			Date.	Height.		Date.	Height.	
	ft.	in.	April.	ft.	in.	April.	ft.	in.
RED RIVER.								
Shreveport	29	9	30	25	11	1	14	10
MISSOURI.								
Fort Sully	—	–	17	8	6	30	6	9
Yankton	20	0	5	10	10	30	6	1
Omaha	16	0	7	16	1	2	7	2
Leavenworth	21	0	8	15	8	1	8	8
MISSISSIPPI.								
St. Paul	14	6	21 to 23	7	0	1	4	4
La Crosse	18	0	30	3	9	1	0	6†
Dubuque	21	10	30	8	0	12	3	11
Davenport	15	0	4,5	9	11	18	5	9
Keokuk	14	6	9 to 11	12	4	18	7	2
St. Louis	30	0	24	23	6	1	16	0
Cairo	40	0	14	40	7	1	32	1
Memphis	34	0	23	33	0	1	24	2
Vicksburg	41	0	30	41	2	1	32	11
New Orleans *	1	6	28	4	4	1	7	—
CUMBERLAND.								
Nashville	42	0	11,12	34	4	6	14	1
OHIO.								
Pittsburgh	20	0	4	9	3	28	4	9
Cincinnati	50	0	1	27	3	19	16	10
Louisville	25	0	[illegible]	15	8	19,22	8	1
SAVANNAH.								
Augusta	—	–	14	29	9	2,3,7,27	8	0

* Below high water mark.

† Below bench mark.

Balloon Ascension at Nashville, Tenn. April 3rd 1877, in Balloon "King Carnival" (containing 25,000. cubic feet)

by Prof S.A. King, Aeronaut, and Sgt. A.C. Ford Signal Service U.S.A. Observer.



Observations of Temperature and Moisture.

TIME	THERMOMETER DRY BULB	THERMOMETER WET BULB	Relative Humidity pct.	FORCE OF VAPOR	DEW POINT	TIME	THERMOMETER DRY BULB	THERMOMETER WET BULB	Relative Humidity pct.	FORCE OF VAPOR	DEW POINT
2:15 pm	60°	51°	49	0.255	41°	3:57 pm	56°	46°	42°	0.189	33°
2:30 "	56°	46°	40	.179	32°	4:00 "	50°	41.5	44	.159	29°
2:42 "	57.5°	47.5°	42	.197	34°	4:03 "	46°	33°	14	.043	0°
3:00 "	Balloon started					4:06 "	46°	32°	10	.031	-7°
3:15 "	59°	50°	49	.247	40°	4:09 "	46°	31°	8	.025	-12°
3:18 "	57°	47°	44	.203	35	4:12 "	47°	32.5°	9	.030	-8°
3:21 "	49°	40°	38	.131	24°	4:18 "	49°	36°	21	.078	+11°
3:24 "	50°	40.5	39	.141	26°	4:24 "	48°	35°	19	.064	+8°
3:27 "	50.5°	41°	39	.142	26°	4:30 "	46°	32.5°	12	.038	-3°
3:30 "	52°	44°	48	.189	33°	4:36 "	47°	34°	14	.046	+1°
3:33 "	54°	45°	44	.183	32°	4:57 "	45.5°	33°	16	.050	+3°
3:36 "	53.5°	44.5	44	.180	32°	5:15 "	45°	33°	17	.052	+4°
3:39 "	55.5°	47°	44	.196	34°	5:21 "	51.5°	42.5°	42	.159	+29°
3:42 "	55°	46°	45	.196	34	5:25 "	Balloon landed				
3:45 "	54°	45°	44	.186	33	5:30 "	55°	47°	48	.211	36°
3:48 "	55°	46°	45	.196	34	5:45 "	54°	46.5	52	.218	37°
3:51 "	56°	46.5°	44	.196	34	5:57 "	53.5°	46	52	.212	36°
3:54 "	56	46°	41	.184	32						

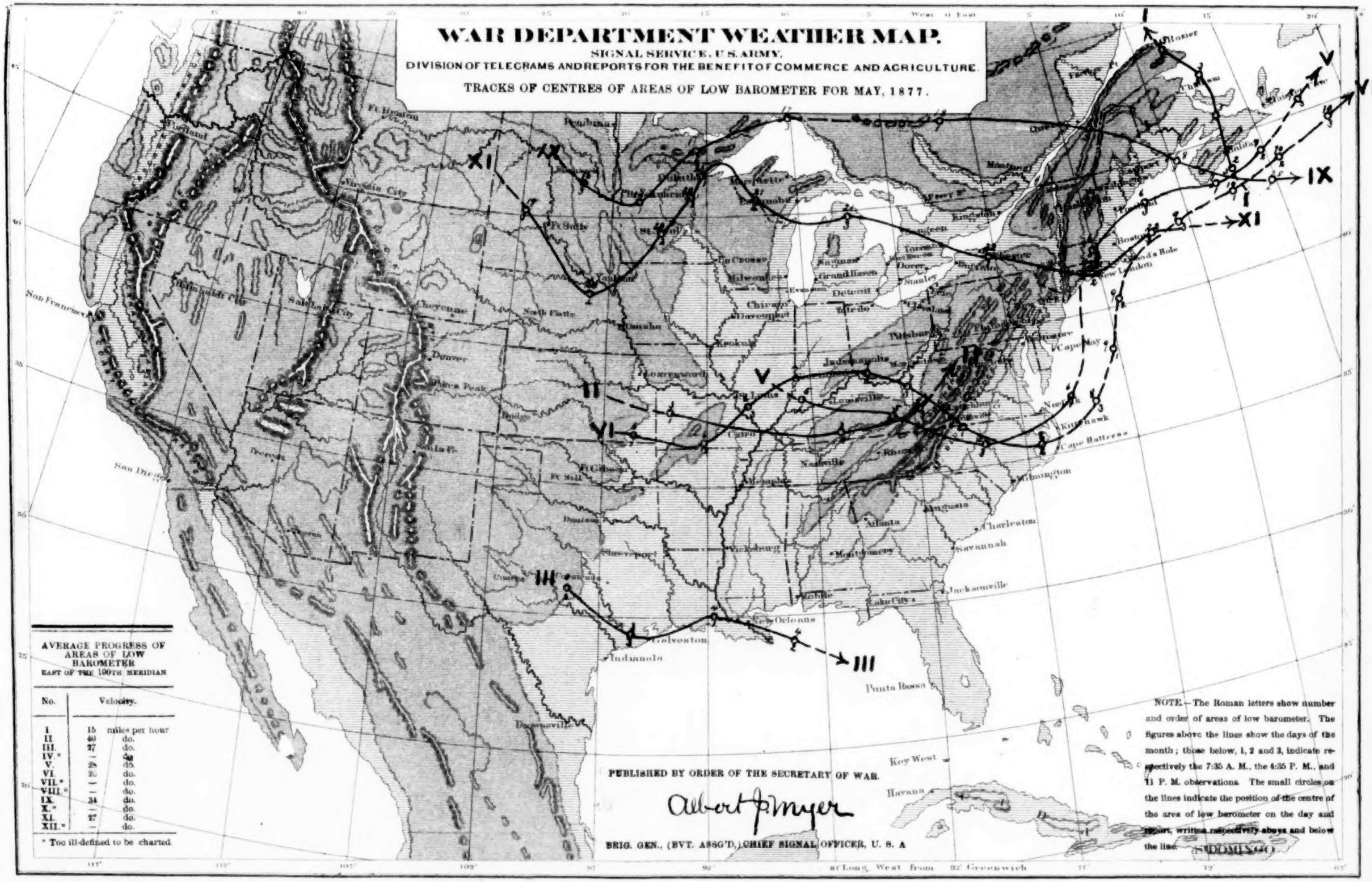
N.B. The Relative Humidity has been computed rigorously by Regnault's formula.

WAR DEPARTMENT WEATHER MAP.

SIGNAL SERVICE, U.S. ARMY.

DIVISION OF TELEGRAMS AND REPORTS FOR THE BENEFIT OF COMMERCE AND AGRICULTURE.

TRACKS OF CENTRES OF AREAS OF LOW BAROMETER FOR MAY, 1877.


I
II
III
V
VI
IX
XI
San Francisco
San Diego
Salt Lake City
Virginia City
Ft. Benton
Cheyenne
Denver
Pike's Peak
Santa Fe
North Platte
Omaha
Dodge
Ft. Sill
Ft. Gibson
Denison
Shreveport
Indianola
Galveston
New Orleans
Vicksburg
Memphis
Nashville
Knoxville
Louisville
Indianapolis
Cairo
Leavenworth
Keokuk
Davenport
Chicago
Milwaukee
La Crosse
St. Paul
Breckenridge
Duluth
Marquette
Escanaba
Pembina
Ft. Sully
Grand Haven
Detroit
Toledo
Cleveland
Pittsburg
Buffalo
Toronto
Kingston
Montreal
Quebec
Boston
New London
Wood's Hole
Cape May
Norfolk
Kitty Hawk
Cape Hatteras
Wilmington
Charleston
Savannah
Augusta
Atlanta
Montgomery
Mobile
Jacksonville
Cedar Keys
Punta Rassa
Key West
Havana
Halifax
Sydney
Chatham
Rimouski
Father Pt.
SDOMINGO
West 0 East
87 Long. West from 82 Greenwich

AVERAGE PROGRESS OF AREAS OF LOW BAROMETER
EAST OF THE 100TH MERIDIAN

No.	Velocity.	
I.	15	miles per hour
II.	40	do.
III.	27	do.
IV.*	—	do.
V.	28	do.
VI.	20	do.
VII.*	—	do.
VIII.*	—	do.
IX.	34	do.
X.*	—	do.
XI.	27	do.
XII.*	—	do.

* Too ill-defined to be charted.

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Albert J. Myer

BRIG. GEN., (BVT. ASSG'D,) CHIEF SIGNAL OFFICER, U. S. A

NOTE.—The Roman letters show number and order of areas of low barometer. The figures above the lines show the days of the month; those below, 1, 2 and 3, indicate respectively the 7:35 A. M., the 4:35 P. M., and 11 P. M. observations. The small circles on the lines indicate the position of the centre of the area of low barometer on the day and report, written respectively above and below the line.

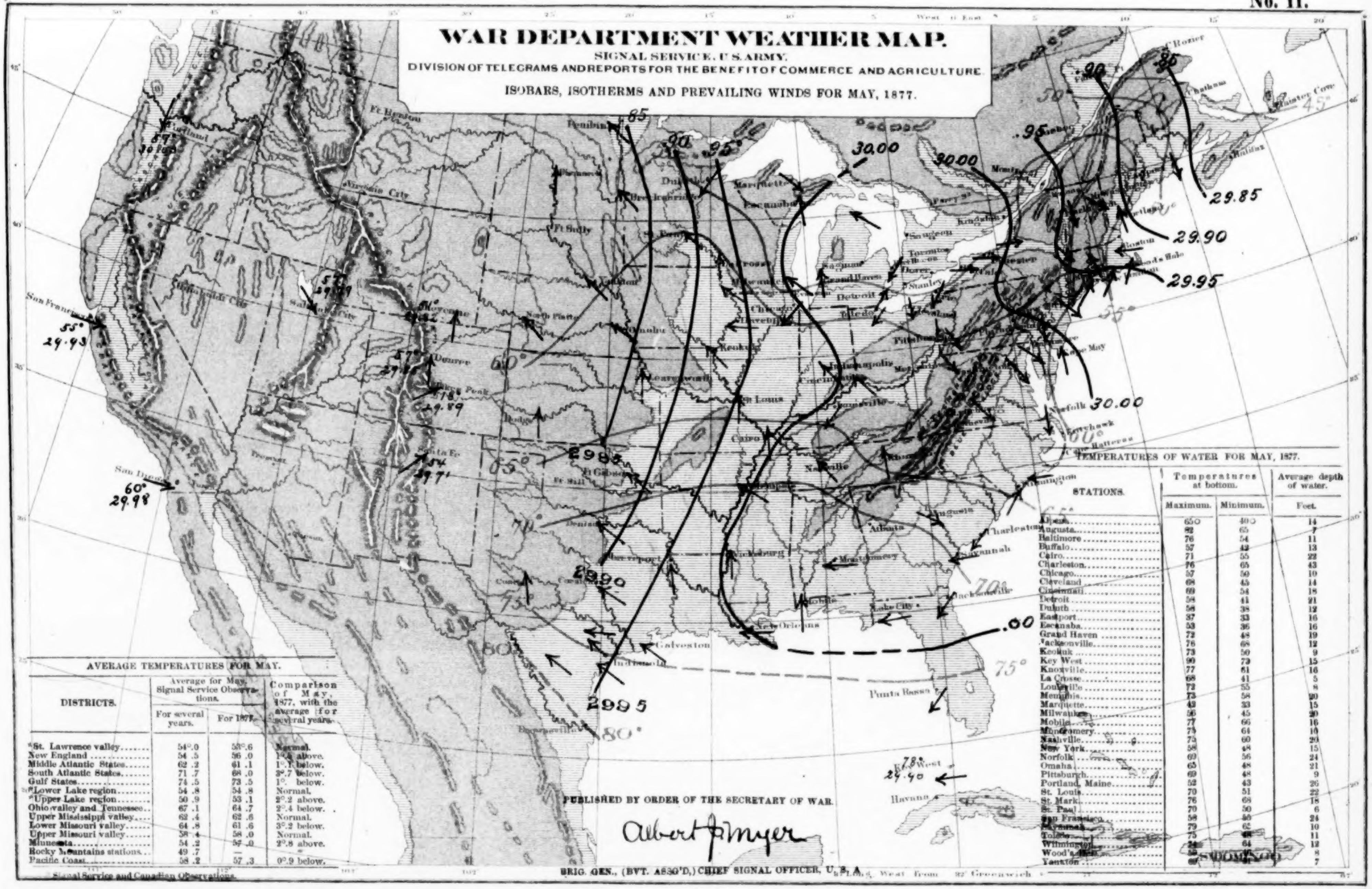
No. II.

WAR DEPARTMENT WEATHER MAP.

SIGNAL SERVICE, U.S. ARMY.

DIVISION OF TELEGRAMS AND REPORTS FOR THE BENEFIT OF COMMERCE AND AGRICULTURE.

ISOBARS, ISOTHERMS AND PREVAILING WINDS FOR MAY, 1877.


29.85
29.90
29.95
30.00
30.00
30.00
.90
.95
.85
.90
.95
2985
2990
2995
.00
45°
50°
55°
60°
65°
70°
75°
80°
55°
29.93
60°
29.98
57°
29.89
78°
29.40
San Francisco
San Diego
Portland
Salt Lake City
Cheyenne
Denver
Pikes Peak
Santa Fe
Pembina
Duluth
Marquette
Escanaba
Chicago
St. Louis
Cairo
Memphis
Nashville
Shreveport
Vicksburg
New Orleans
Galveston
Indianola
Brownsville
Mobile
Montgomery
Atlanta
Augusta
Savannah
Charleston
Jacksonville
Lake City
Punta Rassa
Key West
Havana
Wilmington
Cape Hatteras
Kittyhawk
Norfolk
Cape May
Pittsburgh
Cincinnati
Indianapolis
Detroit
Toledo
Cleveland
Buffalo
Toronto
Kingston
Montreal
Boston
Wood's Hole
Portland
Eastport
Halifax
Chatham
C. Rozier
Sydney
Ft. Benton
Virginia City
Ft. Sully
Yankton
Omaha
North Platte
Leavenworth
Keokuk
La Crosse
Ft. Gibson
Ft. Sill
Denison
Corsicana
San Domingo
West 0 East
Long. West from 32° Greenwich

PUBLISHED BY ORDER OF THE SECRETARY OF WAR.

Albert J. Myer

BRIG. GEN., (BVT. ASS'G'D,) CHIEF SIGNAL OFFICER, U. S. A.

AVERAGE TEMPERATURES FOR MAY.

DISTRICTS.	Average for May, Signal Service Observations.		Comparison of May, 1877, with the average for several years.
	For several years.	For 1877.	
*St. Lawrence valley	54°.0	53°.6	Normal.
New England	54 .5	56 .0	1°.5 above.
Middle Atlantic States	62 .2	61 .1	1°.1 below.
South Atlantic States	71 .7	68 .0	3°.7 below.
Gulf States	74 .5	73 .5	1°. below.
*Lower Lake region	54 .8	54 .8	Normal.
*Upper Lake region	50 .9	53 .1	2°.2 above.
Ohio valley and Tennessee	67 .1	64 .7	2°.4 below.
Upper Mississippi valley	62 .4	62 .6	Normal.
Lower Missouri valley	64 .8	61 .6	3°.2 below.
Upper Missouri valley	58 .4	58 .0	Normal.
Minnesota	54 .2	57 .0	2°.8 above.
Rocky Mountains stations	49 .7	—	—
Pacific Coast	58 .2	57 .3	0°.9 below.

* Signal Service and Canadian Observations.

TEMPERATURES OF WATER FOR MAY, 1877.

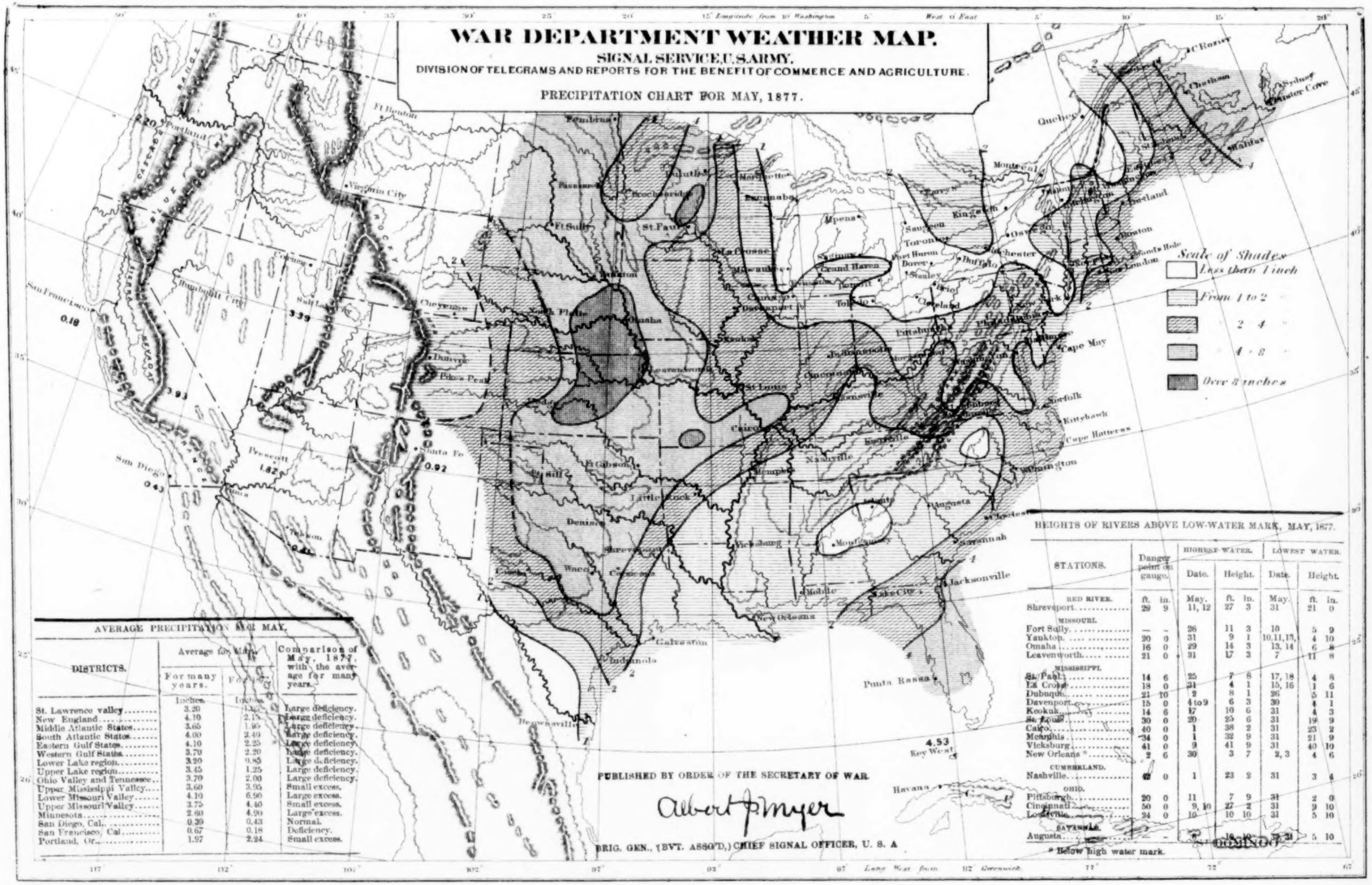
STATIONS.	Temperatures at bottom.		Average depth of water.
	Maximum.	Minimum.	Feet.
Alpena	65○	40○	14
Augusta	82	65	7
Baltimore	76	54	11
Buffalo	57	42	13
Cairo	71	55	22
Charleston	76	65	43
Chicago	57	50	10
Cleveland	68	45	14
Cincinnati	69	54	18
Detroit	58	41	21
Duluth	56	38	12
Eastport	37	33	16
Escanaba	53	36	16
Grand Haven	72	48	19
Jacksonville	76	68	12
Keokuk	73	50	9
Key West	90	79	15
Knoxville	77	61	16
La Crosse	68	41	5
Louisville	72	55	8
Memphis	73	58	20
Marquette	43	33	15
Milwaukee	56	45	20
Mobile	77	66	16
Montgomery	75	64	10
Nashville	75	60	20
New York	58	48	15
Norfolk	69	56	24
Omaha	65	48	21
Pittsburgh	69	48	9
Portland, Maine	52	43	26
St. Louis	70	51	22
St. Mark	76	68	18
St. Paul	70	50	6
San Francisco	58	56	24
Savannah	79	65	10
Toledo	75	[illegible]	11
Wilmington	[illegible]	64	12
Wood's Hole	[illegible]	[illegible]	8
Yankton	[illegible]	[illegible]	7

WAR DEPARTMENT WEATHER MAP.

SIGNAL SERVICE, U. S. ARMY.

DIVISION OF TELEGRAMS AND REPORTS FOR THE BENEFIT OF COMMERCE AND AGRICULTURE.

PRECIPITATION CHART FOR MAY, 1877.


Scale of Shades
Less than 1 inch
From 1 to 2
2 – 4
4 – 8
Over 8 inches
0.18
3.39
3.93
1.82
0.92
0.43
4.53
San Francisco
San Diego
Portland
Virginia City
Salt Lake
Cheyenne
Denver
Santa Fe
Prescott
Omaha
St. Paul
St. Louis
Cairo
Chicago
Detroit
Toledo
Cleveland
Buffalo
Pittsburgh
Cincinnati
Nashville
Memphis
Little Rock
Shreveport
Vicksburg
Mobile
New Orleans
Galveston
Indianola
Brownsville
Montgomery
Augusta
Savannah
Jacksonville
Wilmington
Cape Hatteras
Norfolk
Cape May
Boston
Portland
Montreal
Quebec
Halifax
Key West
Havana
Punta Rassa
Longitude from Washington
West 0 East
Long. West from Greenwich

DISTRICTS.	Average for May. For many years.	Average for May. For 1877.	Comparison of May, 1877, with the average for many years.
	Inches.	Inches.	
St. Lawrence valley	3.20	1.15	Large deficiency.
New England	4.10	2.15	Large deficiency.
Middle Atlantic States	3.65	1.95	Large deficiency.
South Atlantic States	4.00	2.40	Large deficiency.
Eastern Gulf States	4.10	2.25	Large deficiency.
Western Gulf States	3.70	2.20	Large deficiency.
Lower Lake region	3.20	0.85	Large deficiency.
Upper Lake region	3.45	1.25	Large deficiency.
Ohio Valley and Tennessee	3.70	2.00	Large deficiency.
Upper Mississippi Valley	3.60	3.95	Small excess.
Lower Missouri Valley	4.10	6.90	Large excess.
Upper Missouri Valley	3.75	4.40	Small excess.
Minnesota	2.60	4.90	Large excess.
San Diego, Cal.	0.39	0.43	Normal.
San Francisco, Cal	0.67	0.18	Deficiency.
Portland, Or.	1.97	2.24	Small excess.

HEIGHTS OF RIVERS ABOVE LOW-WATER MARK, MAY, 1877.

STATIONS.	Danger point on gauge.		HIGHEST WATER. Date.	HIGHEST WATER. Height.		LOWEST WATER. Date.	LOWEST WATER. Height.	
RED RIVER.	ft.	in.	May.	ft.	in.	May.	ft.	in.
Shreveport	29	9	11, 12	27	3	31	21	0
MISSOURI.								
Fort Sully	—	–	26	11	3	10	5	9
Yankton	20	0	31	9	1	10, 11, 13,	4	10
Omaha	16	0	29	14	3	13, 14	6	8
Leavenworth	21	0	31	17	3	7	11	8
MISSISSIPPI.								
St. Paul	14	6	25	7	8	17, 18	4	8
La Crosse	18	0	31	4	1	15, 16	1	6
Dubuque	21	10	2	8	1	26	5	11
Davenport	15	0	4 to 9	6	3	30	4	1
Keokuk	14	6	17	10	6	31	4	3
St. Louis	30	0	20	25	6	31	19	9
Cairo	40	0	1	38	2	31	23	2
Memphis	34	0	1	32	9	31	21	9
Vicksburg	41	0	9	41	9	31	40	10
New Orleans *	2	6	30	3	7	2, 3	4	6
CUMBERLAND.								
Nashville	[illegible]	0	1	23	2	31	3	4
OHIO.								
Pittsburgh	20	0	11	7	9	31	2	0
Cincinnati	50	0	9, 10	27	2	31	9	10
Louisville	24	0	10	10	10	31	5	10
SAVANNAH.								
Augusta	—	–	[illegible]	10	10	[illegible]	5	10

* Below high water mark.

PUBLISHED BY ORDER OF THE SECRETARY OF WAR.

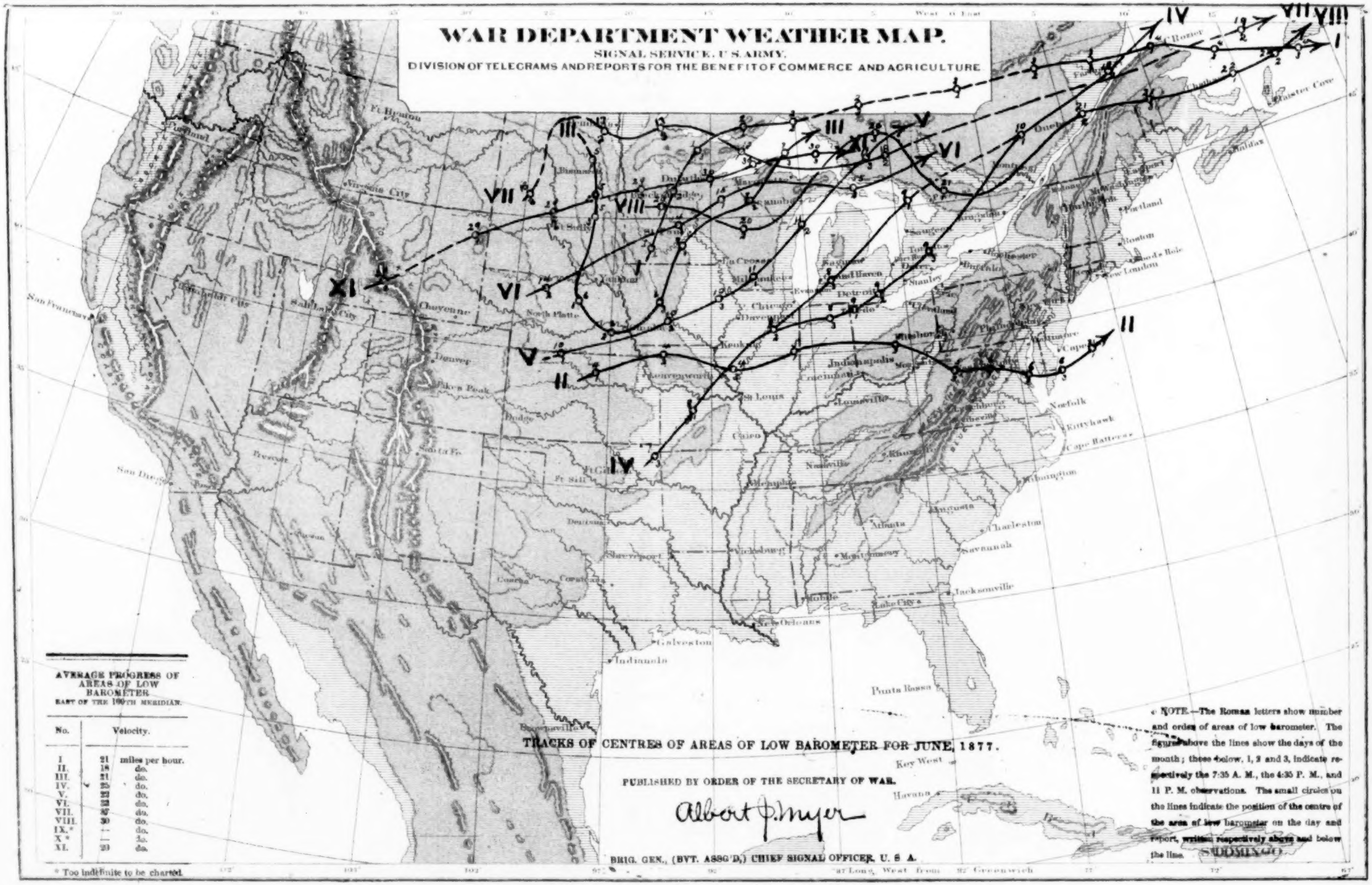
Albert J. Myer

BRIG. GEN., (BVT. ASSG'D,) CHIEF SIGNAL OFFICER, U. S. A.

WAR DEPARTMENT WEATHER MAP.

SIGNAL SERVICE, U. S. ARMY.

DIVISION OF TELEGRAMS AND REPORTS FOR THE BENEFIT OF COMMERCE AND AGRICULTURE.


I
II
III
IV
V
VI
VII
VIII
XI
San Francisco
San Diego
Portland
Virginia City
Salt Lake City
Ft. Benton
Cheyenne
Denver
Pikes Peak
Santa Fe
North Platte
Dodge
Ft. Sill
Duluth
Bismarck
La Crosse
Milwaukee
Chicago
Davenport
Keokuk
St. Louis
Leavenworth
Cairo
Louisville
Cincinnati
Indianapolis
Detroit
Toledo
Cleveland
Buffalo
Rochester
Pittsburg
Nashville
Memphis
Vicksburg
Shreveport
Denison
Galveston
Indianola
New Orleans
Mobile
Montgomery
Atlanta
Augusta
Savannah
Charleston
Wilmington
Cape Hatteras
Kittyhawk
Norfolk
Cape May
Boston
Portland
Halifax
Quebec
Montreal
Jacksonville
Punta Rassa
Key West
Havana
Brownsville
S. DOMINGO

AVERAGE PROGRESS OF AREAS OF LOW BAROMETER

EAST OF THE 100TH MERIDIAN.

No.	Velocity.	
I.	21	miles per hour.
II.	18	do.
III.	21	do.
IV.	25	do.
V.	23	do.
VI.	22	do.
VII.	27	do.
VIII.	30	do.
IX.*	—	do.
X.*	—	do.
XI.	20	do.

* Too indefinite to be charted.

TRACKS OF CENTRES OF AREAS OF LOW BAROMETER FOR JUNE, 1877.

PUBLISHED BY ORDER OF THE SECRETARY OF WAR.

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BRIG. GEN., (BVT. ASSG'D,) CHIEF SIGNAL OFFICER, U. S. A.

NOTE.—The Roman letters show number and order of areas of low barometer. The figures above the lines show the days of the month; those below, 1, 2 and 3, indicate respectively the 7:35 A. M., the 4:35 P. M., and 11 P. M. observations. The small circles on the lines indicate the position of the centre of the area of low barometer on the day and report, written respectively above and below the line.

No. II.

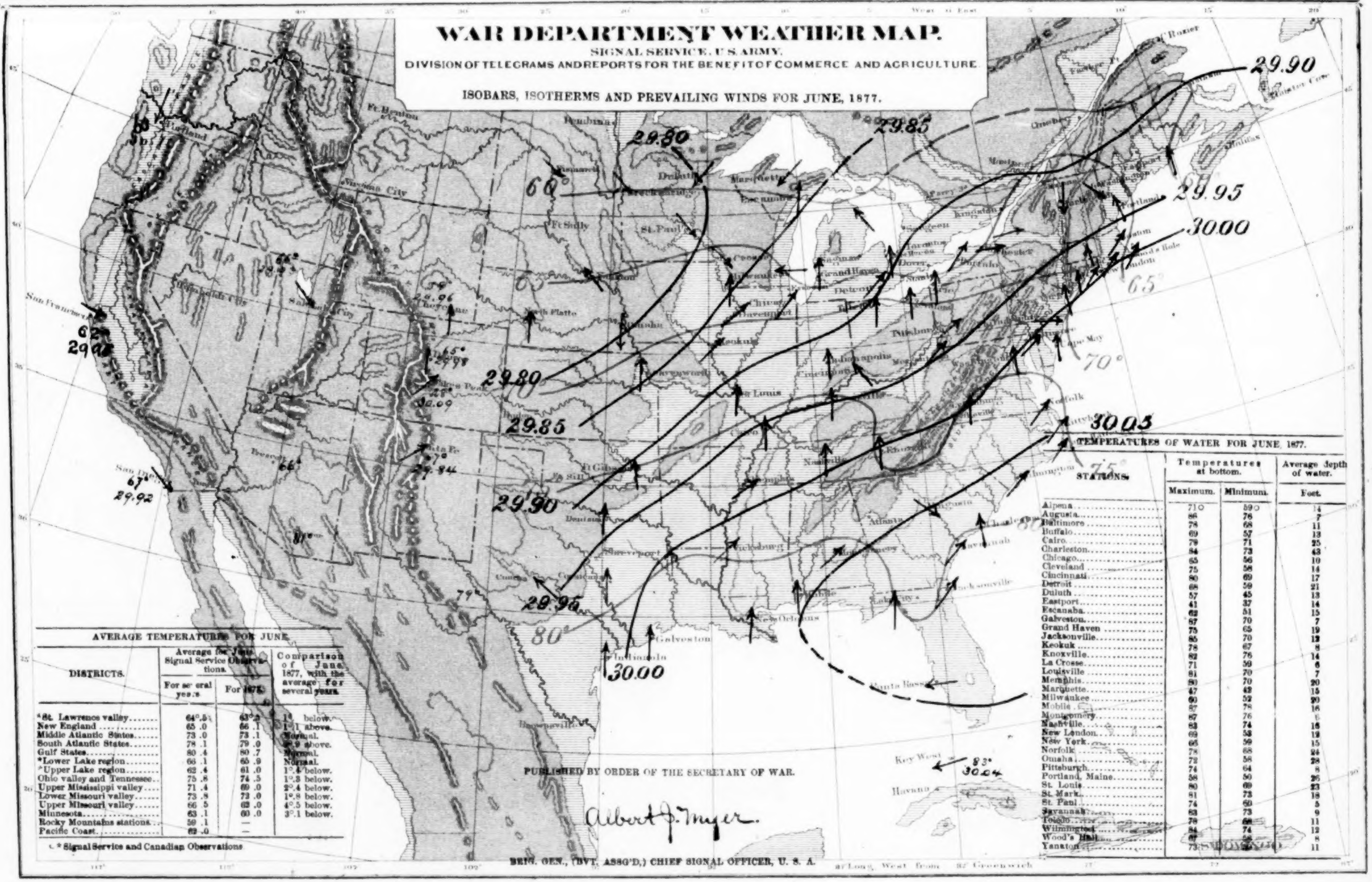
No. II.

WAR DEPARTMENT WEATHER MAP.

SIGNAL SERVICE, U. S. ARMY.

DIVISION OF TELEGRAMS AND REPORTS FOR THE BENEFIT OF COMMERCE AND AGRICULTURE.

ISOBARS, ISOTHERMS AND PREVAILING WINDS FOR JUNE, 1877.


29.90
29.85
29.80
29.95
30.00
30.05
29.80
29.85
29.90
29.95
30.00
60°
65°
70°
75°
80°
62°
29.92
67°
29.92
65°
29.98
30.09
29.84
29.96
83°
30.04
Key West
Havana
Pembina
Duluth
Marquette
Escanaba
St. Paul
Milwaukee
Chicago
Grand Haven
Detroit
Toledo
Cleveland
Buffalo
Pittsburgh
Cincinnati
Indianapolis
Louisville
St. Louis
Keokuk
Davenport
Omaha
North Platte
Cheyenne
Denver
Santa Fe
Salt Lake City
San Francisco
San Diego
Portland
Memphis
Nashville
Knoxville
Vicksburg
Shreveport
New Orleans
Galveston
Indianola
Mobile
Augusta
Savannah
Charleston
Jacksonville
Norfolk
Cape May
Wilmington
Boston
Portland
Halifax
Quebec
Montreal
Kingston
Toronto
Fort Benton
Virginia City
Bismarck
Breckenridge
Fort Sully
Fort Gibson
Denison
Brownsville
Punta Rassa
Wood's Hole
New London

AVERAGE TEMPERATURES FOR JUNE.

DISTRICTS.	Average for June, Signal Service Observations.		Comparison of June, 1877, with the average for several years.
	For several years.	For 1877.	
*St. Lawrence valley	64°.5	63°.5	1° below.
New England	65 .0	66 .1	1°.1 above.
Middle Atlantic States	73 .0	73 .1	Normal.
South Atlantic States	78 .1	79 .0	0°.9 above.
Gulf States	80 .4	80 .7	Normal.
*Lower Lake region	66 .1	65 .9	Normal.
*Upper Lake region	62 .4	61 .0	1°.4 below.
Ohio valley and Tennessee	75 .8	74 .5	1°.3 below.
Upper Mississippi valley	71 .4	69 .0	2°.4 below.
Lower Missouri valley	73 .8	72 .0	1°.8 below.
Upper Missouri valley	66 .5	62 .0	4°.5 below.
Minnesota	63 .1	60 .0	3°.1 below.
Rocky Mountains stations	59 .1	—	
Pacific Coast	62 .0	—	

* Signal Service and Canadian Observations.

TEMPERATURES OF WATER FOR JUNE, 1877.

STATIONS.	Temperatures at bottom.		Average depth of water.
	Maximum.	Minimum.	Feet.
Alpena	71°	59°	14
Augusta	86	76	7
Baltimore	78	68	11
Buffalo	69	57	13
Cairo	79	71	25
Charleston	84	73	43
Chicago	65	56	10
Cleveland	75	58	14
Cincinnati	80	69	17
Detroit	68	59	21
Duluth	57	45	13
Eastport	41	37	14
Escanaba	62	51	15
Galveston	87	70	7
Grand Haven	75	65	19
Jacksonville	85	70	12
Keokuk	78	67	8
Knoxville	82	76	14
La Crosse	71	59	6
Louisville	81	70	7
Memphis	80	70	20
Marquette	47	42	15
Milwaukee	60	52	20
Mobile	87	78	16
Montgomery	87	76	5
Nashville	83	74	16
New London	69	53	19
New York	65	59	15
Norfolk	78	68	24
Omaha	72	58	28
Pittsburgh	74	64	8
Portland, Maine	58	50	26
St. Louis	80	69	23
St. Mark	81	73	18
St. Paul	74	60	5
Savannah	83	73	9
Toledo	78	66	11
Wilmington	84	74	12
Wood's Hole	67	58	8
Yankton	73	[illegible]	11

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Albert J. Myer.

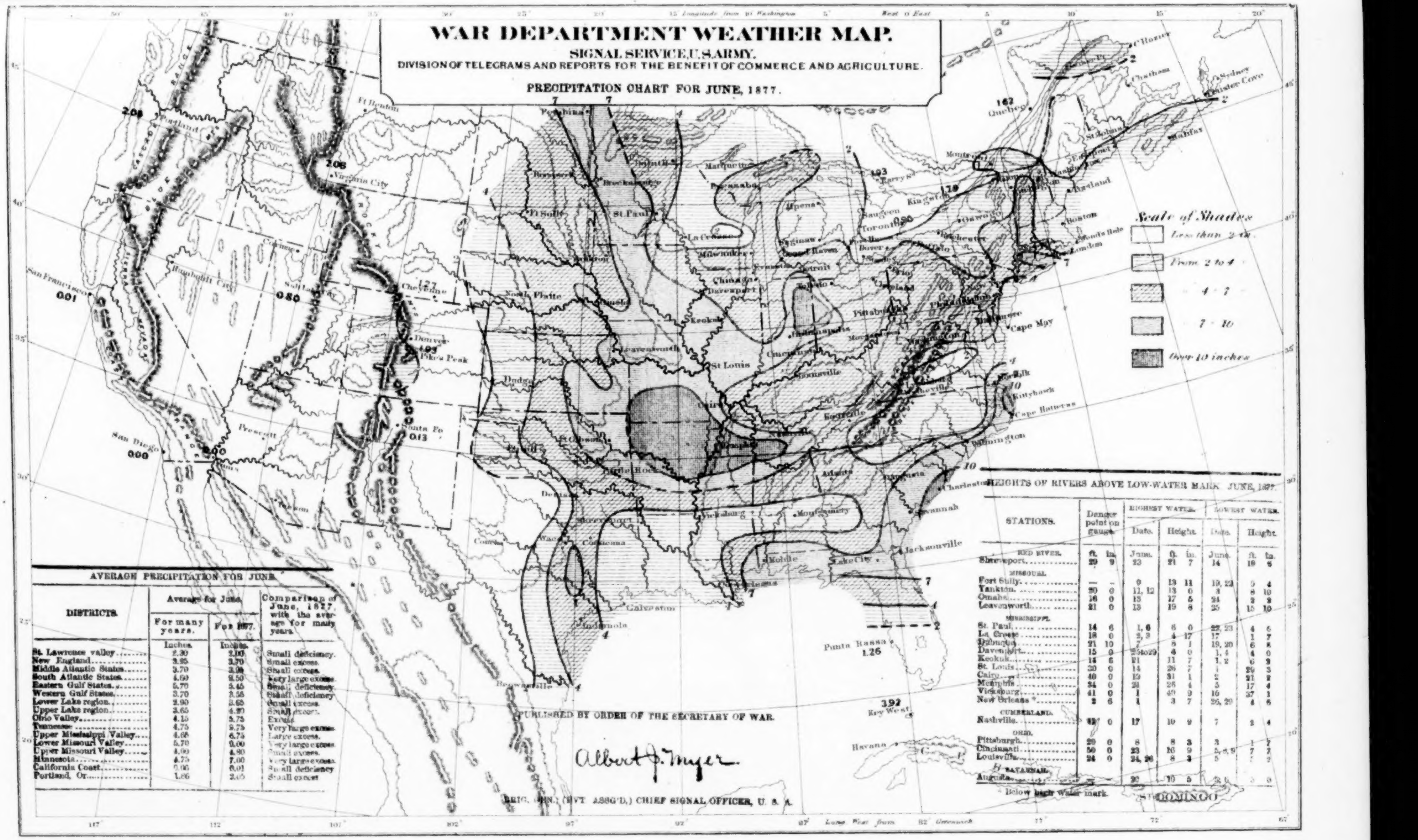
BRIG. GEN., (BVT. ASSG'D,) CHIEF SIGNAL OFFICER, U. S. A.

WAR DEPARTMENT WEATHER MAP.

SIGNAL SERVICE, U.S. ARMY.

DIVISION OF TELEGRAMS AND REPORTS FOR THE BENEFIT OF COMMERCE AND AGRICULTURE.

PRECIPITATION CHART FOR JUNE, 1877.


Scale of Shades
Less than 2 in.
From 2 to 4
4 - 7
7 - 10
Over 10 inches
Longitude from Washington
West 0 East
Long. West from Greenwich
Ft Benton
Portland
Virginia City
Corinne
Humboldt City
Salt Lake
San Francisco
San Diego
Prescott
Cheyenne
Denver
Pike's Peak
Santa Fe
North Platte
Dodge
Leavenworth
Breckenridge
St. Paul
Duluth
Pembina
La Crosse
Milwaukee
Chicago
Davenport
Keokuk
St Louis
Marquette
Escanaba
Alpena
Saginaw
Grand Haven
Detroit
Toledo
Cleveland
Indianapolis
Cincinnati
Louisville
Nashville
Knoxville
Pittsburgh
Toronto
Kingston
Oswego
Rochester
Buffalo
Montreal
Quebec
Portland
Boston
Burlington
Albany
New London
Cape May
Baltimore
Norfolk
Kittyhawk
Cape Hatteras
Wilmington
Charleston
Savannah
Augusta
Atlanta
Jacksonville
Lake City
Mobile
Montgomery
Vicksburg
Shreveport
Little Rock
Memphis
Galveston
Indianola
Brownsville
Denison
Corsicana
Cedar Keys
Punta Rassa
1.26
Key West
3.92
Havana
St. Domingo
Chatham
Sydney
Chatham
St. Johns
Halifax
Eastport
Rockland
Wood's Hole
2.08
2.06
1.77
1.93
0.80
0.01
0.00
0.13
1.03
1.62
1.79
1.93
0.90

DISTRICTS.	Average for June.		Comparison of June, 1877, with the average for many years.
	For many years.	For 1877.	
	Inches.	Inches.	
St. Lawrence valley	2.30	2.00	Small deficiency.
New England	3.95	3.70	Small excess.
Middle Atlantic States	3.70	3.98	Small excess.
South Atlantic States	4.60	9.50	Very large excess.
Eastern Gulf States	5.70	5.45	Small deficiency.
Western Gulf States	3.70	3.58	Small deficiency.
Lower Lake region	2.90	3.65	Small excess.
Upper Lake region	3.65	4.20	Small excess.
Ohio Valley	4.15	5.75	Excess.
Tennessee	4.75	9.75	Very large excess.
Upper Mississippi Valley	4.68	6.75	Large excess.
Lower Missouri Valley	5.70	9.00	Very large excess.
Upper Missouri Valley	4.00	4.90	Small excess.
Minnesota	4.75	7.00	Very large excess.
California Coast	0.06	0.01	Small deficiency.
Portland, Or.	1.86	2.05	Small excess.

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BRIG. GEN. (BVT. ASSG'D,) CHIEF SIGNAL OFFICER, U. S. A.

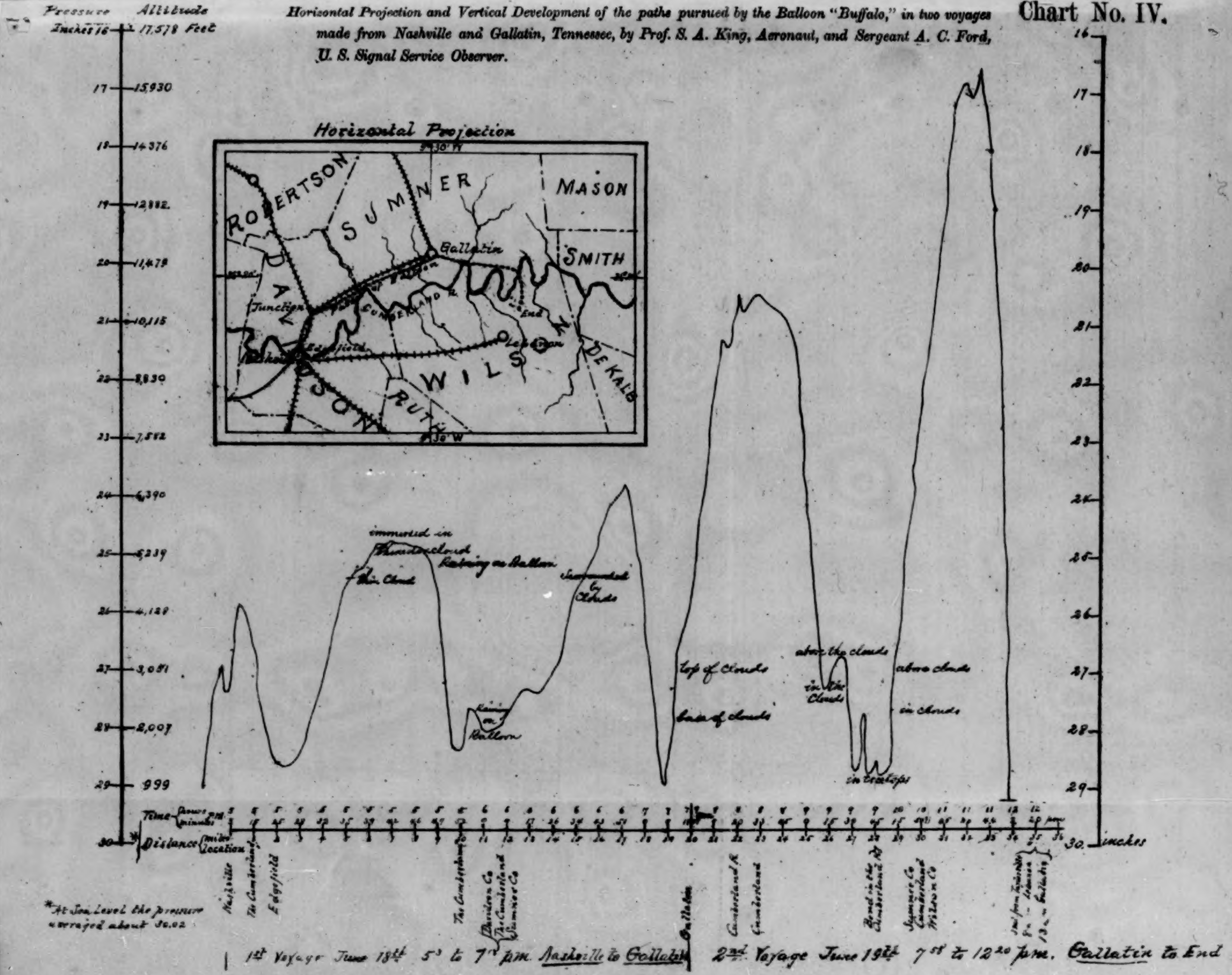
HEIGHTS OF RIVERS ABOVE LOW-WATER MARK JUNE, 1877.

STATIONS.	Danger point on gauge.		Highest Water.			Lowest Water.		
			Date.	Height.		Date.	Height.	
RED RIVER.	ft.	in.	June.	ft.	in.	June.	ft.	in.
Shreveport	29	9	23	21	7	14	19	6
MISSOURI.								
Fort Sully	—	—	9	13	11	19, 22	5	4
Yankton	20	0	11, 12	13	0	3	8	10
Omaha	16	0	13	17	5	24	2	2
Leavenworth	21	0	13	19	8	25	15	10
MISSISSIPPI.								
St. Paul	14	6	1, 6	6	0	22, 23	4	6
La Crosse	18	0	2, 3	4	17	17	1	7
Dubuque	21	10	7	8	1	19, 20	6	8
Davenport	15	0	25 to 29	4	0	1, 4	4	0
Keokuk	14	6	21	11	7	1, 2	6	9
St. Louis	30	0	14	28	7	1	20	3
Cairo	40	0	19	31	1	2	21	2
Memphis	34	0	21	26	4	5	17	4
Vicksburg	41	0	1	40	9	16	37	1
New Orleans *	2	6	1	3	7	25, 29	4	6
CUMBERLAND.								
Nashville	42	0	17	10	9	7	2	4
OHIO.								
Pittsburgh	20	0	8	8	3	3	1	7
Cincinnati	50	0	23	16	9	5, 8, 9	7	7
Louisville	24	0	24, 26	8	3	5	5	2
SAVANNAH.								
Augusta	—	—	20	10	5	3, 6	5	0

* Below high water mark.

Chart No. IV.

Horizontal Projection and Vertical Development of the paths pursued by the Balloon "Buffalo," in two voyages made from Nashville and Gallatin, Tennessee, by Prof. S. A. King, Aëronaut, and Sergeant A. C. Ford, U. S. Signal Service Observer.

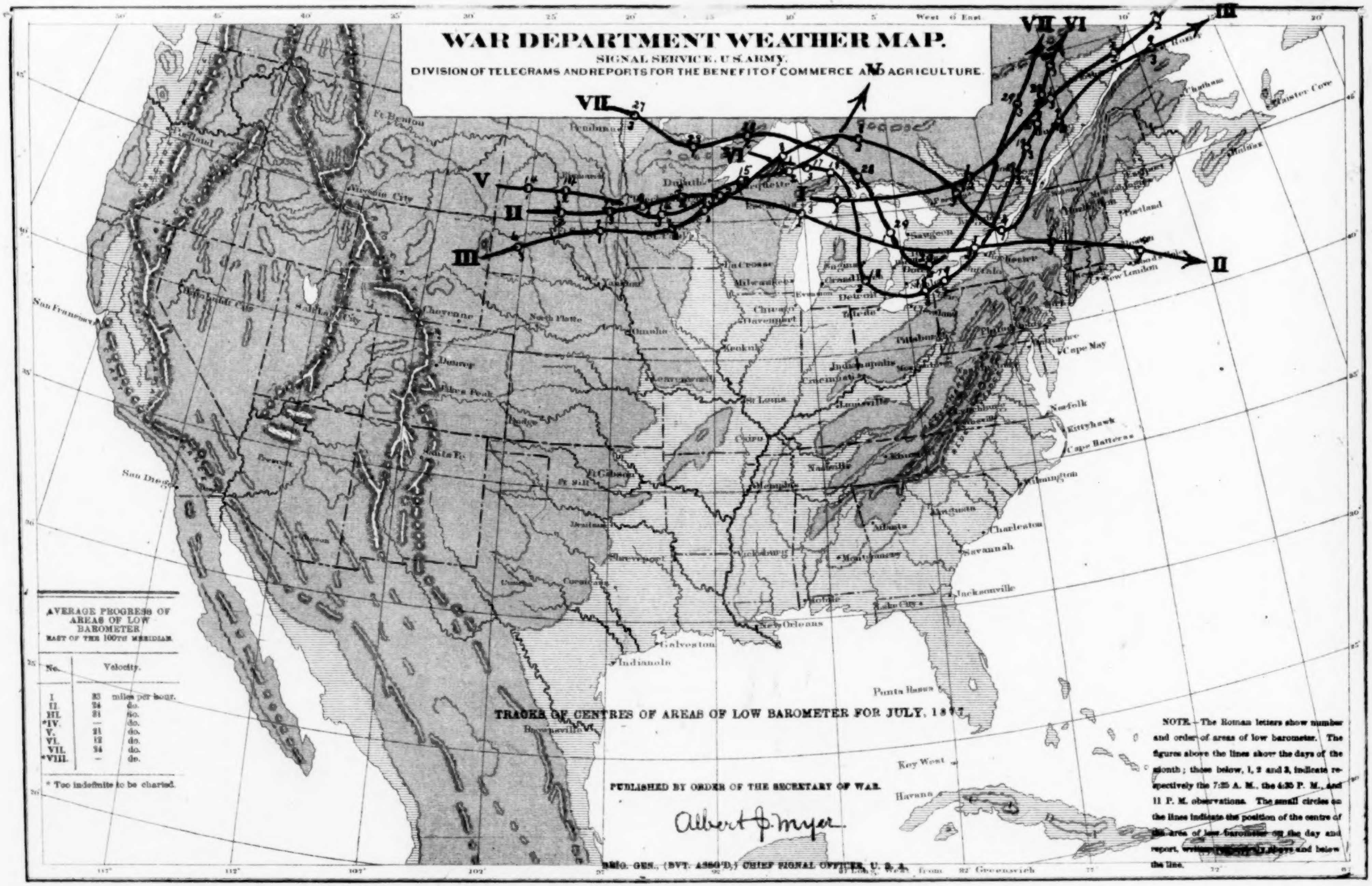


*At Sea Level the pressure averaged about 30.02

WAR DEPARTMENT WEATHER MAP.

SIGNAL SERVICE, U.S. ARMY.

DIVISION OF TELEGRAMS AND REPORTS FOR THE BENEFIT OF COMMERCE AND AGRICULTURE.


VII
VI
V
II
III
Ft. Benton
Pembina
Duluth
Marquette
La Crosse
Milwaukee
Chicago
Davenport
Keokuk
Omaha
North Platte
Cheyenne
Denver
Pikes Peak
Santa Fe
Dodge
Ft. Sill
Ft. Gibson
St. Louis
Cairo
Nashville
Memphis
Knoxville
Indianapolis
Cincinnati
Louisville
Pittsburg
Toledo
Detroit
Grand Haven
Saugeen
Rochester
Cleveland
Portland
New London
Cape May
Norfolk
Kittyhawk
Cape Hatteras
Wilmington
Charleston
Savannah
Augusta
Atlanta
Montgomery
Mobile
Jacksonville
New Orleans
Vicksburg
Shreveport
Galveston
Indianola
Brownsville
Corsicana
Denison
Punta Rassa
Key West
Havana
San Francisco
San Diego
Portland
Virginia City
Salt Lake City
Chatham
Halifax
Master Cove
West 0 East
Long. West from Greenwich

AVERAGE PROGRESS OF AREAS OF LOW BAROMETER
EAST OF THE 100TH MERIDIAN.

No.	Velocity.	
I	33	miles per hour.
II.	24	do.
III.	31	do.
*IV.	—	do.
V.	21	do.
VI.	12	do.
VII.	34	do.
*VIII.	—	do.

* Too indefinite to be charted.

TRACKS OF CENTRES OF AREAS OF LOW BAROMETER FOR JULY, 1877

NOTE.—The Roman letters show number and order of areas of low barometer. The figures above the lines show the days of the month; those below, 1, 2 and 3, indicate respectively the 7:35 A. M., the 4:35 P. M., and 11 P. M. observations. The small circles on the lines indicate the position of the centre of the area of low barometer on the day and report, written respectively above and below the line.

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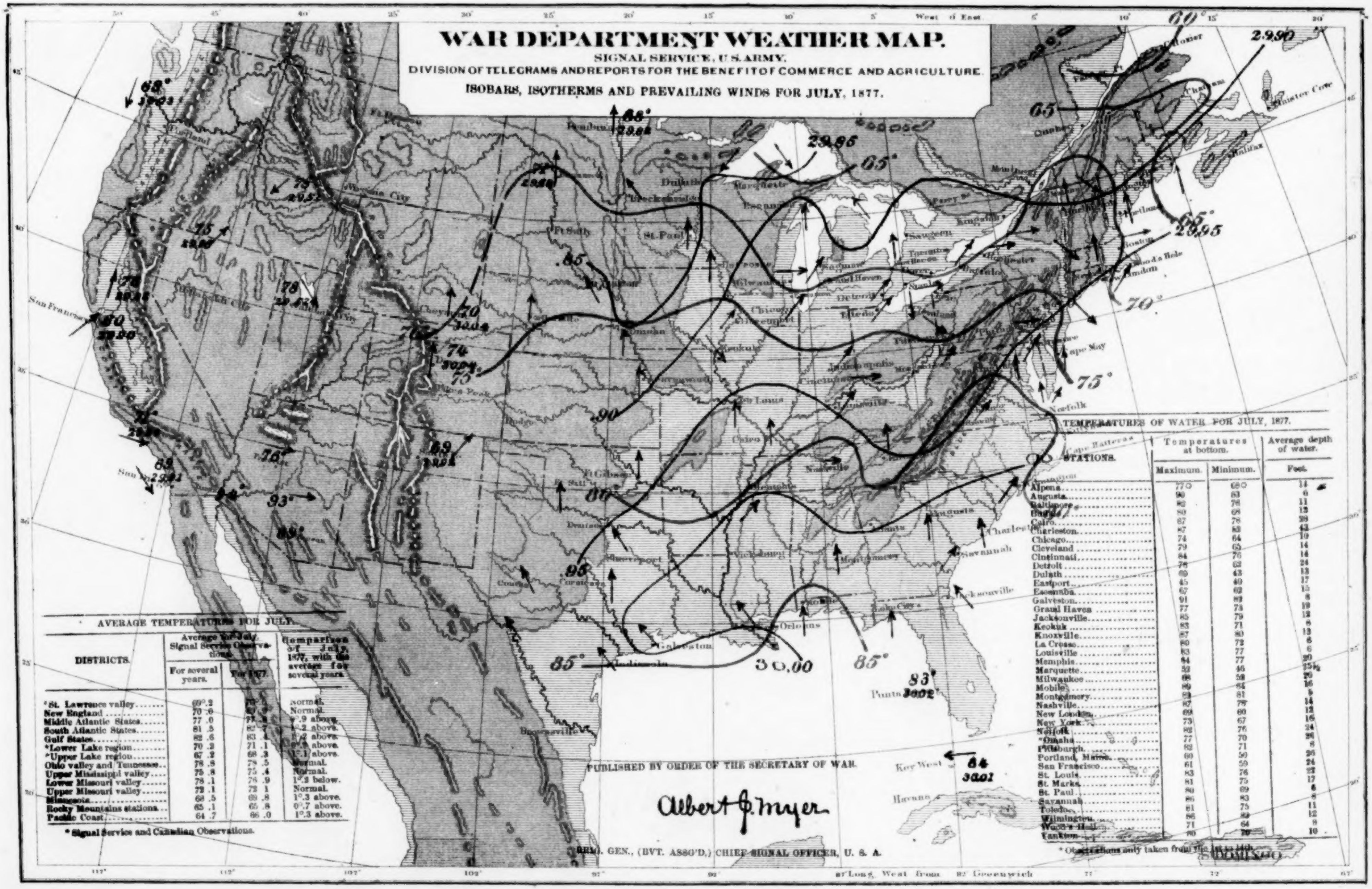
BRIG. GEN., (BVT. ASSG'D,) CHIEF SIGNAL OFFICER, U. S. A.

No. 11.

No. 11.



WAR DEPARTMENT WEATHER MAP.

SIGNAL SERVICE, U.S. ARMY.

DIVISION OF TELEGRAMS AND REPORTS FOR THE BENEFIT OF COMMERCE AND AGRICULTURE.

ISOBARS, ISOTHERMS AND PREVAILING WINDS FOR JULY, 1877.

60°
2990
65
29.85
65°
65°
29.95
70°
75°
68°
29.82
72
29.85
85
70
30.04
74
30.04
75
90
69
29.94
80
95
85°
30.00
85°
83°
30.02
84
30.01
68°
30.03
73
29.97
75
29.90
78
29.92
78
29.92
80
29.90
72
29.90
69
29.91
84°
93°
76
89°
Quebec
Halifax
Portland
Boston
Wood's Hole
New London
Cape May
Norfolk
Cape Hatteras
Wilmington
Charleston
Savannah
Jacksonville
Augusta
Atlanta
Montgomery
Mobile
New Orleans
Galveston
Indianola
Brownsville
Shreveport
Vicksburg
Memphis
Nashville
Knoxville
Louisville
Cincinnati
Indianapolis
Cairo
St. Louis
Keokuk
Omaha
Chicago
Milwaukee
Grand Haven
Detroit
Toledo
Cleveland
Buffalo
Rochester
Kingston
Toronto
Saugeen
Escanaba
Marquette
Duluth
Breckenridge
St. Paul
Ft. Sully
Pembina
Virginia City
Salt Lake City
Cheyenne
Denver
Pike's Peak
Ft. Gibson
Denison
Corsicana
Punta Rassa
Key West
Havana
San Francisco
San Diego
Portland
Greenwich

AVERAGE TEMPERATURES FOR JULY.

DISTRICTS.	Average for July. Signal Service Observations. For several years.	Average for July. Signal Service Observations. For 1877.	Comparison of July, 1877, with the average for several years.
*St. Lawrence valley	69°.2	[illegible]	Normal.
New England	70 .0	[illegible]	Normal.
Middle Atlantic States	77 .0	[illegible]	[illegible]°.9 above.
South Atlantic States	81 .5	82 .7	1°.2 above.
Gulf States	82 .6	83 .[illegible]	1°.2 above.
*Lower Lake region	70 .2	71 .1	[illegible]°.9 above.
*Upper Lake region	67 .2	68 .3	1°.1 above.
Ohio valley and Tennessee	78 .5	78 .5	Normal.
Upper Mississippi valley	75 .8	75 .4	Normal.
Lower Missouri valley	78 .1	76 .9	1°.2 below.
Upper Missouri valley	73 .1	73 1	Normal.
Minnesota	68 .5	69 .8	1°.3 above.
Rocky Mountains stations	65 .1	65 .8	0°.7 above.
Pacific Coast	64 .7	66 .0	1°.3 above.

* Signal Service and Canadian Observations.

TEMPERATURES OF WATER FOR JULY, 1877.

STATIONS.	Temperatures at bottom. Maximum.	Temperatures at bottom. Minimum.	Average depth of water. Feet.
Alpena	77°	68°	14
Augusta	90	83	6
Baltimore	82	76	11
Buffalo	80	68	13
Cairo	87	78	28
Charleston	87	83	42
Chicago	74	64	10
Cleveland	79	65	14
Cincinnati	84	76	14
Detroit	78	62	24
Duluth	60	43	13
Eastport	45	40	17
Escanaba	67	62	15
Galveston	91	83	8
Grand Haven	77	73	19
Jacksonville	85	79	12
Keokuk	83	71	8
Knoxville	87	80	13
La Crosse	80	72	6
Louisville	83	77	6
Memphis	84	77	20
Marquette	52	46	15½
Milwaukee	68	58	20
Mobile	89	84	16
Montgomery	89	81	5
Nashville	87	78	14
New London	69	60	12
New York	73	67	16
Norfolk	82	76	24
*Omaha	77	70	26
Pittsburgh	82	71	8
Portland, Maine	60	50	26
San Francisco	61	59	24
St. Louis	83	76	22
St. Marks	81	75	17
St. Paul	80	69	6
Savannah	86	83	8
Toledo	81	75	11
Wilmington	86	82	12
Wood's Hole	71	64	8
Yankton	80	70	10

* Observations only taken from the 1st to 14th.

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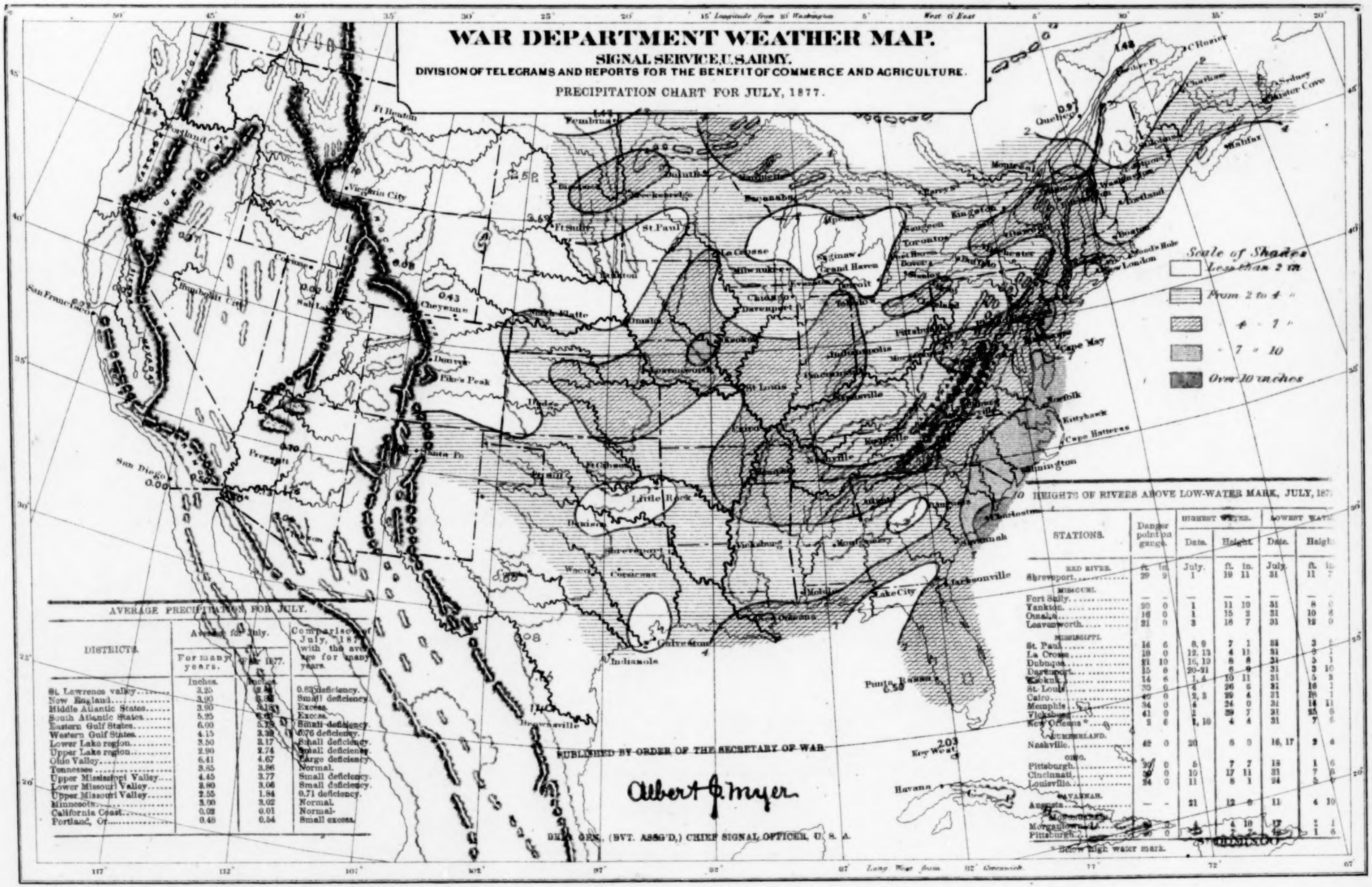
WAR DEPARTMENT WEATHER MAP.

SIGNAL SERVICE, U.S. ARMY.

DIVISION OF TELEGRAMS AND REPORTS FOR THE BENEFIT OF COMMERCE AND AGRICULTURE.

PRECIPITATION CHART FOR JULY, 1877.


Scale of Shades
Less than 2 in
From 2 to 4 "
4 " 7 "
7 " 10
Over 10 inches
Longitude from Washington
West 0 East
Long West from Greenwich
San Francisco
San Diego
Portland
Humboldt City
Virginia City
Ft Benton
Salt Lake
Cheyenne
Denver
Pike's Peak
Santa Fe
Prescott
Pembina
Duluth
Breckenridge
St. Paul
Ft Sully
North Platte
Omaha
Dodge
La Crosse
Milwaukee
Chicago
Davenport
Keokuk
St Louis
Leavenworth
Little Rock
Shreveport
Corsicana
Galveston
Indianola
Brownsville
Vicksburg
New Orleans
Mobile
Montgomery
Nashville
Memphis
Cairo
Louisville
Cincinnati
Indianapolis
Pittsburgh
Grand Haven
Saginaw
Detroit
Toledo
Buffalo
Rochester
Toronto
Kingston
Montreal
Quebec
Burlington
Portland
Boston
Wood's Hole
New London
Cape May
Norfolk
Kittyhawk
Cape Hatteras
Wilmington
Charleston
Savannah
Augusta
Jacksonville
Lake City
Punta Rassa
Key West
Havana
Halifax
Sydney
Chatham
C. Rozier
Escanaba
Marquette
Alpena
Port Huron
Oswego
Saugeen
0.43
0.00
0.97
2.52
3.69
2.03
6.59
1.48

AVERAGE PRECIPITATION FOR JULY.

DISTRICTS.	Average for July.		Comparison of July, 1877, with the average for many years.
	For many years.	For 1877.	
	Inches.	Inches.	
St. Lawrence valley	3.25	[illegible]	0.83 deficiency.
New England	3.90	[illegible]	Small deficiency.
Middle Atlantic States	3.90	5.18	Excess.
South Atlantic States	5.25	[illegible]	Excess.
Eastern Gulf States	6.00	5.75	Small deficiency.
Western Gulf States	4.15	3.39	0.76 deficiency.
Lower Lake region	3.50	2.17	Small deficiency.
Upper Lake region	2.90	2.74	Small deficiency.
Ohio Valley	6.41	4.67	Large deficiency.
Tennessee	3.85	3.86	Normal.
Upper Mississippi Valley	4.45	3.77	Small deficiency.
Lower Missouri Valley	3.80	3.06	Small deficiency.
Upper Missouri Valley	2.55	1.84	0.71 deficiency.
Minnesota	3.00	3.02	Normal.
California Coast	0.02	0.01	Normal.
Portland, Or	0.48	0.54	Small excess.

HEIGHTS OF RIVERS ABOVE LOW-WATER MARK, JULY, 187

STATIONS.	Danger point on gauge.		HIGHEST WATER.			LOWEST WAT		
			Date.	Height.		Date.	Heigh	
	ft.	in.	July.	ft.	in.	July.	ft.	in.
RED RIVER.								
Shreveport	29	9	1	19	11	31	11	7
MISSOURI.								
Fort Sully	—	—	—	—	—	—	—	—
Yankton	20	0	1	11	10	31	8	0
Omaha	16	0	1	15	2	31	10	8
Leavenworth	21	0	3	18	7	31	12	0
MISSISSIPPI.								
St. Paul	14	6	8, 9	7	1	31	3	[illegible]
La Crosse	18	0	12, 13	4	11	31	3	1
Dubuque	21	10	18, 19	8	8	31	5	1
Davenport	15	6	20-21	6	9	31	3	10
Keokuk	14	6	1, 4	10	11	31	5	2
St. Louis	30	0	4	26	5	31	16	1
Cairo	40	0	2, 3	29	4	31	18	1
Memphis	34	0	4	24	0	31	14	11
Vicksburg	41	0	1	29	7	31	25	6
New Orleans *	2	6	1, 10	4	4	31	7	6
CUMBERLAND.								
Nashville	42	0	20	6	0	16, 17	2	4
OHIO.								
Pittsburgh	20	0	5	7	7	13	1	6
Cincinnati	50	0	10	17	11	31	7	6
Louisville	24	0	11	8	1	24	5	[illegible]
SAVANNAH.								
Augusta	—	—	21	12	0	11	4	10
MONONGAHELA.								
Morgantown	[illegible]	[illegible]	4	4	10	17	2	1
Pittsburgh	20	0	[illegible]	7	7	13	1	6

* Below high water mark.

PUBLISHED BY ORDER OF THE SECRETARY OF WAR.

Albert J. Myer

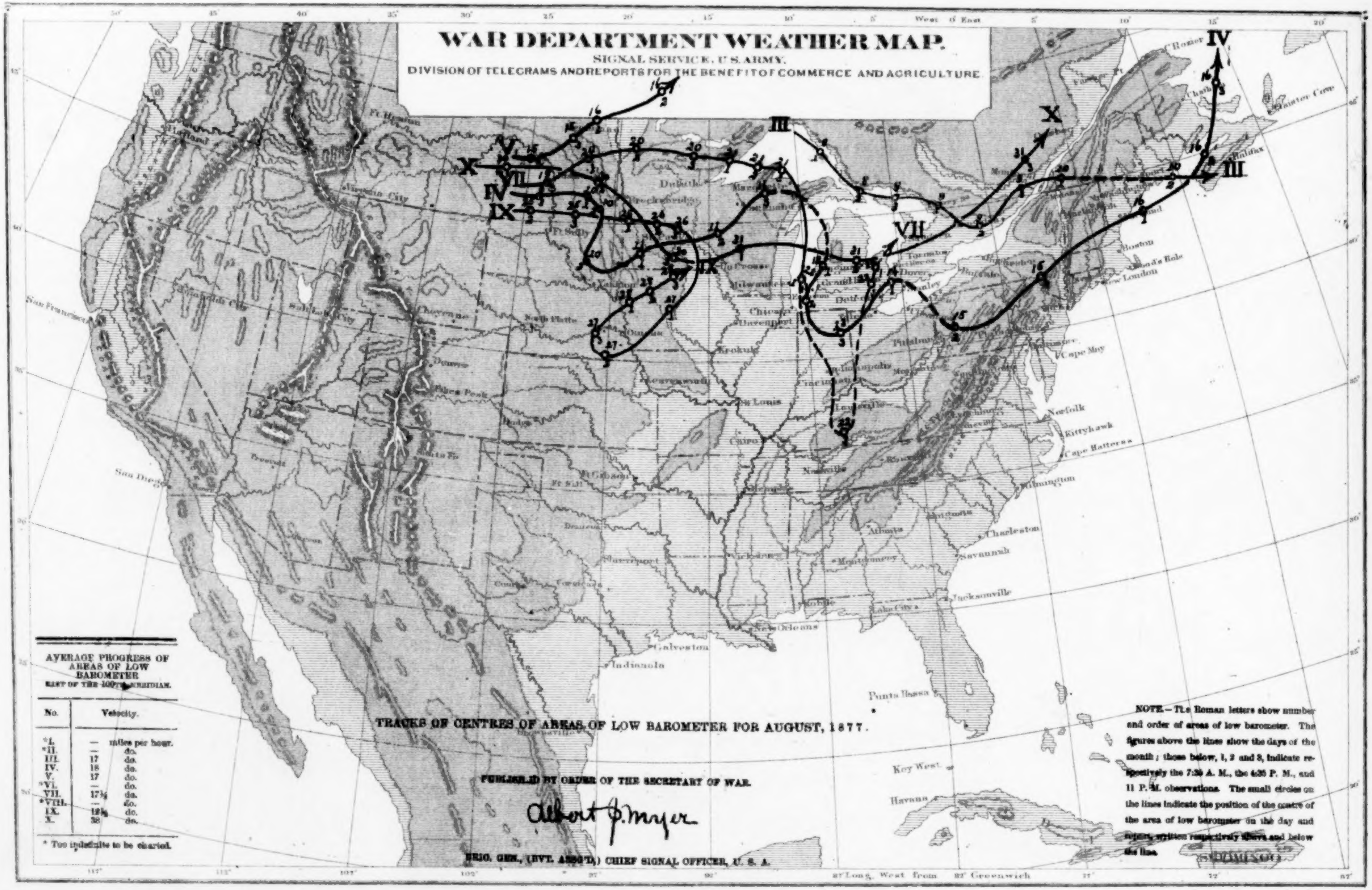
BRIG. GEN. (BVT. ASSG'D,) CHIEF SIGNAL OFFICER, U. S. A.

No. 1.

WAR DEPARTMENT WEATHER MAP.

SIGNAL SERVICE, U.S. ARMY.

DIVISION OF TELEGRAMS AND REPORTS FOR THE BENEFIT OF COMMERCE AND AGRICULTURE.


I
III
IV
V
VII
IX
X
West 0° East
Ft Benton
Salt Lake City
Cheyenne
North Platte
Denver
Pikes Peak
Santa Fe
San Francisco
San Diego
Duluth
Breckenridge
Fort Sully
Yankton
Omaha
La Crosse
Milwaukee
Chicago
Davenport
Keokuk
St Louis
Cairo
Indianapolis
Cincinnati
Louisville
Nashville
Memphis
Vicksburg
Shreveport
New Orleans
Mobile
Montgomery
Atlanta
Savannah
Charleston
Jacksonville
Galveston
Indianola
Toronto
Buffalo
Pittsburg
Boston
New London
Cape May
Norfolk
Kittyhawk
Cape Hatteras
Wilmington
Halifax
Punta Rassa
Key West
Havana
Long. West from Greenwich

TRACKS OF CENTRES OF AREAS OF LOW BAROMETER FOR AUGUST, 1877.

PUBLISHED BY ORDER OF THE SECRETARY OF WAR.

Albert J. Myer

BRIG. GEN., (BVT. ASSG'D,) CHIEF SIGNAL OFFICER, U. S. A.

AVERAGE PROGRESS OF AREAS OF LOW BAROMETER EAST OF THE 100TH MERIDIAN.

No.	Velocity.	
*I.	—	miles per hour.
*II.	—	do.
III.	17	do.
IV.	18	do.
V.	17	do.
*VI.	—	do.
VII.	17½	do.
*VIII.	—	do.
IX.	19½	do.
X.	38	do.

* Too indefinite to be charted.

NOTE.—The Roman letters show number and order of areas of low barometer. The figures above the lines show the days of the month; those below, 1, 2 and 3, indicate respectively the 7:35 A. M., the 4:35 P. M., and 11 P. M. observations. The small circles on the lines indicate the position of the centre of the area of low barometer on the day and hour, written respectively above and below the line.

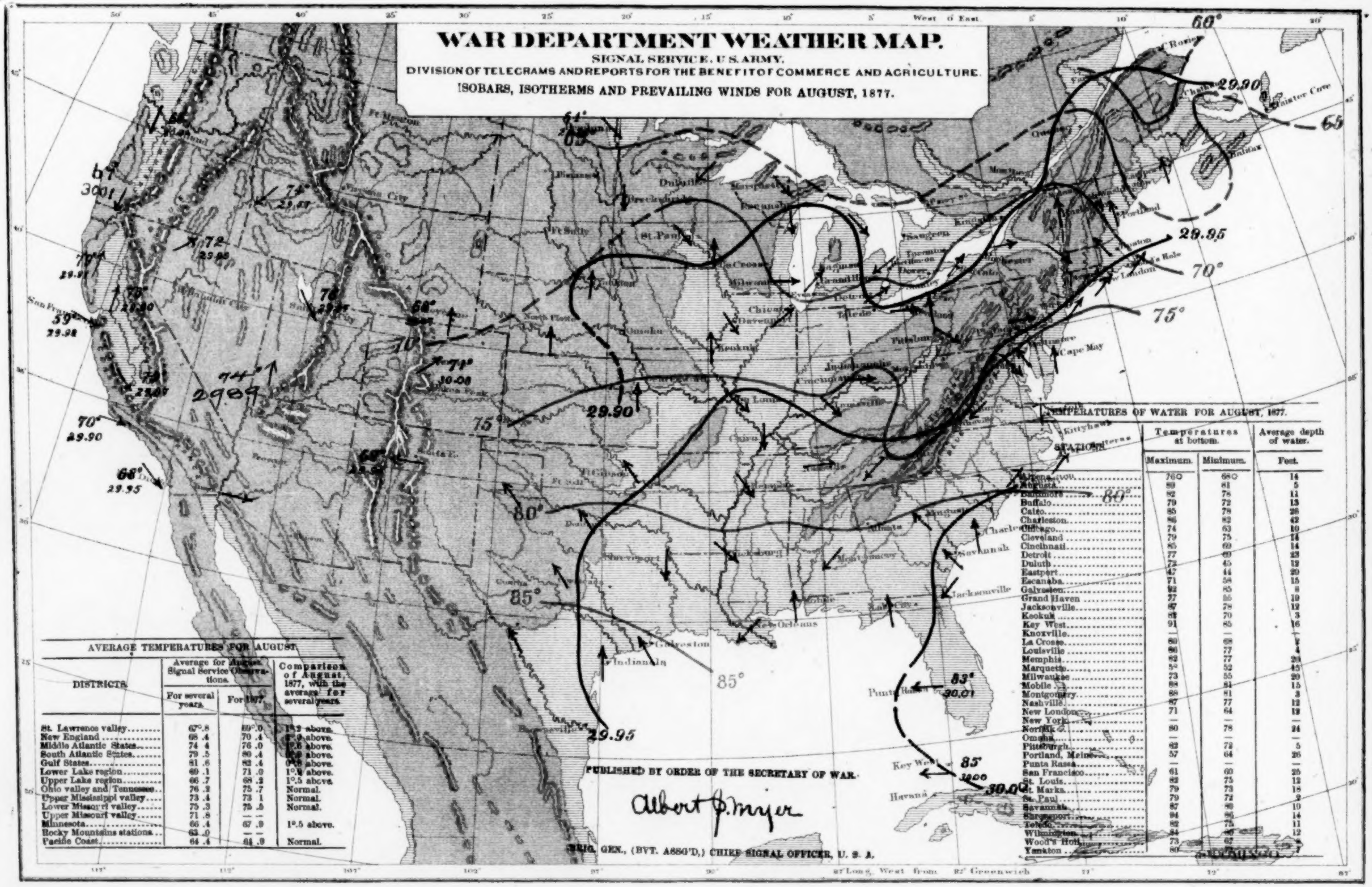
No. II.

No. II.

WAR DEPARTMENT WEATHER MAP.

SIGNAL SERVICE, U.S. ARMY.
DIVISION OF TELEGRAMS AND REPORTS FOR THE BENEFIT OF COMMERCE AND AGRICULTURE.

ISOBARS, ISOTHERMS AND PREVAILING WINDS FOR AUGUST, 1877.


29.90
29.95
30.00
70°
75°
80°
85°
60°
65
29.90
29.95
30.01
29.89
74°
Cape May
Kittyhawk
Hatteras
San Francisco
Punta Rassa
Key West
Havana
Galveston
Indianola
Chicago
Davenport
Keokuk
St. Paul
Duluth
La Crosse
Milwaukee
Toledo
Pittsburgh
Indianapolis
Cincinnati
St. Louis
Savannah
Jacksonville
New Orleans
Shreveport
Omaha
North Platte
Virginia City
Salt Lake City
Quebec
New London
West 0 East
Long. West from Greenwich

AVERAGE TEMPERATURES FOR AUGUST.

DISTRICTS.	Average for August. Signal Service Observations. For several years.	Average for August. Signal Service Observations. For 1877.	Comparison of August, 1877, with the average for several years.
St. Lawrence valley	67°.8	69°.0	1°.2 above.
New England	68 .4	70 .4	2°.0 above.
Middle Atlantic States	74 .4	76 .0	1°.6 above.
South Atlantic States	79 .5	80 .4	0°.9 above.
Gulf States	81 .6	82 .4	0°.8 above.
Lower Lake region	69 .1	71 .0	1°.9 above.
Upper Lake region	66 .7	68 .2	1°.5 above.
Ohio valley and Tennessee	76 .2	75 .7	Normal.
Upper Mississippi valley	73 .4	73 .1	Normal.
Lower Missouri valley	75 .3	75 .5	Normal.
Upper Missouri valley	71 .8	— —	
Minnesota	66 .4	67 .9	1°.5 above.
Rocky Mountains stations	63 .0	— —	
Pacific Coast	64 .4	64 .9	Normal.

TEMPERATURES OF WATER FOR AUGUST, 1877.

STATIONS.	Temperatures at bottom. Maximum.	Temperatures at bottom. Minimum.	Average depth of water. Feet.
Alpena	76°	68°	14
Augusta	89	81	5
Baltimore	82	78	11
Buffalo	79	72	13
Cairo	85	78	26
Charleston	86	82	42
Chicago	74	63	10
Cleveland	79	75	14
Cincinnati	85	69	14
Detroit	77	69	23
Duluth	72	45	12
Eastport	47	44	20
Escanaba	71	58	15
Galveston	92	85	8
Grand Haven	77	56	19
Jacksonville	87	78	12
Keokuk	83	70	3
Key West	91	85	16
Knoxville	—	—	—
La Crosse	80	68	7
Louisville	86	77	4
Memphis	82	77	29
Marquette	59	52	45
Milwaukee	73	55	20
Mobile	88	81	15
Montgomery	88	81	3
Nashville	87	77	12
New London	71	64	12
New York	—	—	—
Norfolk	80	78	24
Omaha	—	—	—
Pittsburgh	82	72	5
Portland, Maine	57	64	26
Punta Rassa	—	—	—
San Francisco	61	60	25
St. Louis	82	75	12
St. Marks	79	73	18
St. Paul	79	72	9
Savannah	87	80	10
Shreveport	94	86	14
Toledo	82	75	11
Wilmington	84	80	12
Wood's Holl	73	67	6
Yankton	80	[illegible]	7

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Albert J. Myer

BRIG. GEN., (BVT. ASS'G'D,) CHIEF SIGNAL OFFICER, U. S. A.

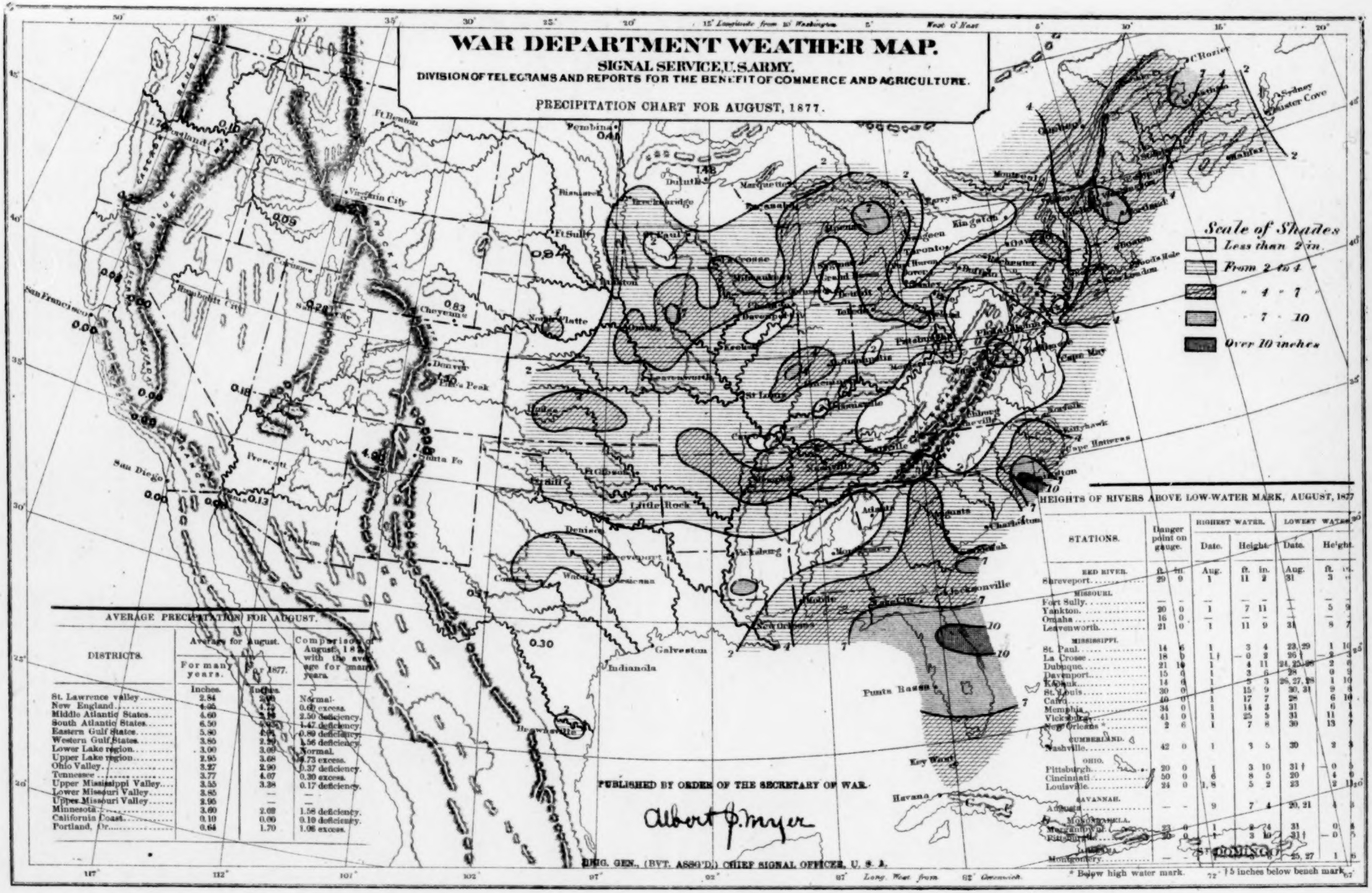
No. III.

WAR DEPARTMENT WEATHER MAP.

SIGNAL SERVICE, U.S. ARMY.

DIVISION OF TELEGRAMS AND REPORTS FOR THE BENEFIT OF COMMERCE AND AGRICULTURE.

PRECIPITATION CHART FOR AUGUST, 1877.


Scale of Shades
Less than 2 in.
From 2 to 4
" 4 " 7
" 7 " 10
Over 10 inches
Longitude from Washington
West / East
Long. West from Greenwich
Ft Benton
Pembina
Duluth
Marquette
Breckenridge
Bismarck
Ft Sully
Virginia City
North Platte
Cheyenne
Denver
Pikes Peak
Santa Fe
Salt Lake City
Humboldt City
Prescott
San Francisco
San Diego
Portland
St Paul
La Crosse
Milwaukee
Grand Haven
Chicago
Davenport
Keokuk
Leavenworth
St Louis
Indianapolis
Louisville
Cincinnati
Nashville
Pittsburgh
Toledo
Detroit
Buffalo
Rochester
Toronto
Kingston
Montreal
Quebec
Boston
New York
Philadelphia
Cape May
Norfolk
Cape Hatteras
Wilmington
Charleston
Savannah
Atlanta
Augusta
Montgomery
Mobile
New Orleans
Vicksburg
Memphis
Little Rock
Ft Gibson
Ft Sill
Denison
Shreveport
Corsicana
Galveston
Indianola
Brownsville
Jacksonville
Cedar Keys
Punta Rassa
Key West
Havana
St. Domingo
Halifax
Sydney
C. Rozier
0.45
1.48
0.84
0.83
0.28
0.05
0.10
1.72
0.00
0.13
0.18
4.08
1.50
0.30

AVERAGE PRECIPITATION FOR AUGUST.

DISTRICTS.	Average for August.		Comparison of August, 1877, with the average for many years.
	For many years.	For 1877.	
	Inches.	Inches.	
St. Lawrence valley	2.84	[illegible]	Normal.
New England	4.05	[illegible]	0.60 excess.
Middle Atlantic States	4.60	[illegible]	2.50 deficiency.
South Atlantic States	6.50	[illegible]	1.47 deficiency.
Eastern Gulf States	5.80	[illegible]	0.80 deficiency.
Western Gulf States	3.85	[illegible]	1.56 deficiency.
Lower Lake region	3.00	3.00	Normal.
Upper Lake region	2.95	3.68	0.73 excess.
Ohio Valley	3.27	2.90	0.37 deficiency.
Tennessee	3.77	4.07	0.30 excess.
Upper Mississippi Valley	3.55	3.38	0.17 deficiency.
Lower Missouri Valley	3.85	—	—
Upper Missouri Valley	2.96	—	—
Minnesota	3.60	2.02	1.58 deficiency.
California Coast	0.10	0.00	0.10 deficiency.
Portland, Or.	0.64	1.70	1.06 excess.

HEIGHTS OF RIVERS ABOVE LOW-WATER MARK, AUGUST, 1877

STATIONS.	Danger point on gauge.		Highest Water.			Lowest Water.		
			Date.	Height.		Date.	Height.	
	ft.	in.	Aug.	ft.	in.	Aug.	ft.	in.
RED RIVER.								
Shreveport	29	9	1	11	2	31	3	[illegible]
MISSOURI.								
Fort Sully	—	—	—	—	—	—	—	—
Yankton	20	0	1	7	11	—	5	9
Omaha	16	0	—	—	—	—	—	—
Leavenworth	21	0	1	11	9	31	8	7
MISSISSIPPI.								
St. Paul	14	6	1	3	4	23, 29	1	10
La Crosse	18	0	1 †	− 0	2	26 †	− 2	3
Dubuque	21	10	1	4	11	24, 25, 26	2	6
Davenport	15	0	1	3	6	28	0	9
Keokuk	14	6	1	5	3	26, 27, 28	1	10
St. Louis	30	0	1	15	9	30, 31	9	8
Cairo	40	0	1	17	7	28	6	10
Memphis	34	0	1	14	3	31	6	1
Vicksburg	41	0	1	25	5	31	11	4
New Orleans *	2	6	1	7	8	30	13	7
CUMBERLAND.								
Nashville	42	0	1	3	5	30	2	3
OHIO.								
Pittsburgh	20	0	1	3	10	31 †	− 0	5
Cincinnati	50	0	6	8	5	20	4	0
Louisville	24	0	1, 8	5	2	23	2	11
SAVANNAH.								
Augusta	—	—	9	7	4	20, 21	3	3
MONONGAHELA.								
Morgantown	23	0	1	2	4	31	0	8
Pittsburgh	20	0	1	3	10	31 †	− 0	5
ALABAMA.								
Montgomery	—	—	[illegible]	[illegible]	[illegible]	25, 27	1	5

* Below high water mark.

† 5 inches below bench mark.

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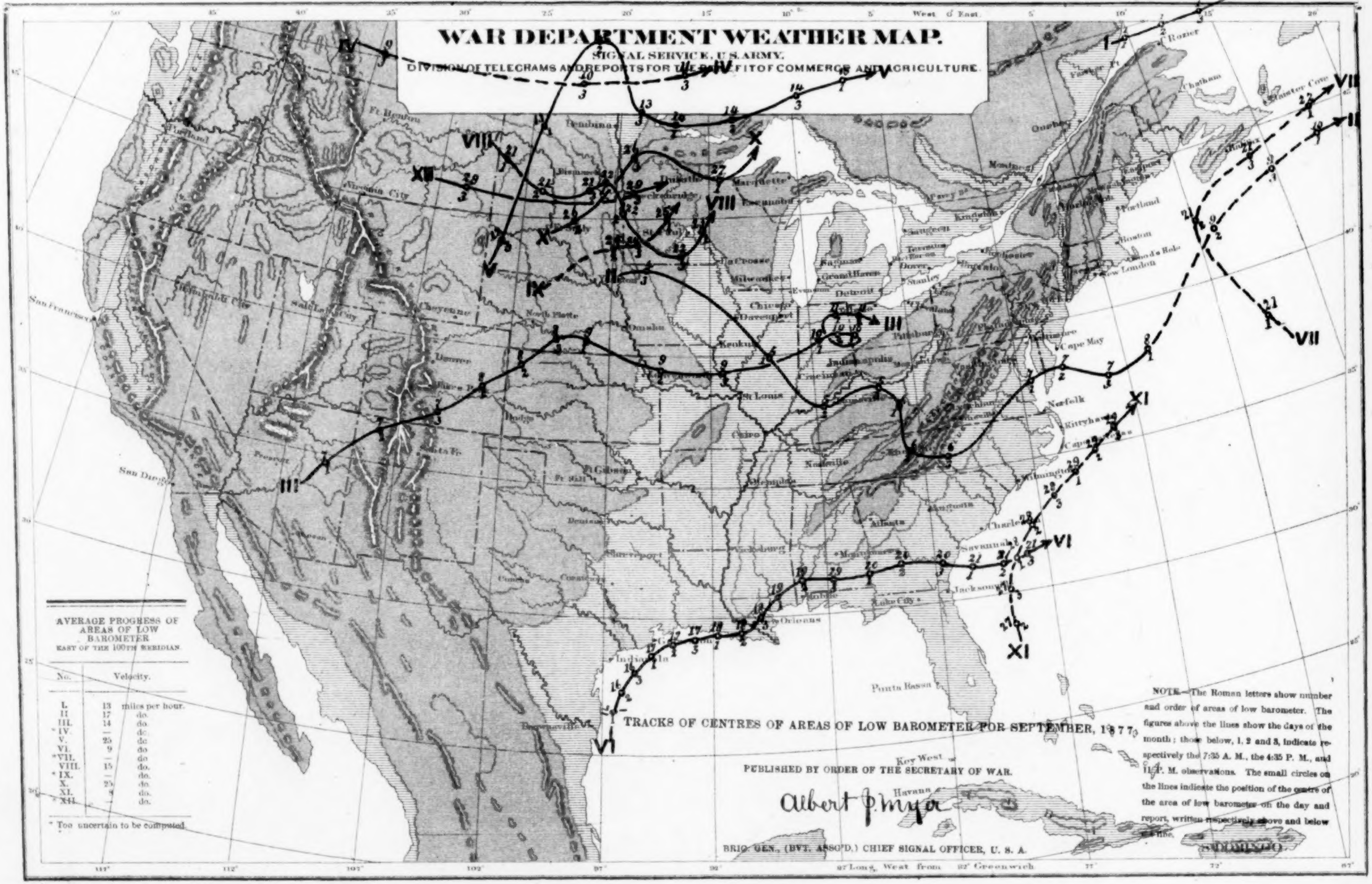
Albert J. Myer

BRIG. GEN., (BVT. ASSG'D.) CHIEF SIGNAL OFFICER, U. S. A.



WAR DEPARTMENT WEATHER MAP.

SIGNAL SERVICE, U.S. ARMY.

DIVISION OF TELEGRAMS AND REPORTS FOR THE BENEFIT OF COMMERCE AND AGRICULTURE.

TRACKS OF CENTRES OF AREAS OF LOW BAROMETER FOR SEPTEMBER, 1877.

I
II
III
IV
V
VI
VII
VIII
IX
X
XI
XII
West 0 East.
Long. West from 82° Greenwich
San Francisco
San Diego
Portland
Ft. Benton
Pembina
Bismarck
Duluth
Marquette
Escanaba
Virginia City
Salt Lake City
Cheyenne
North Platte
Omaha
Denver
Santa Fe
Ft. Sill
Ft. Gibson
Shreveport
Denison
Corsicana
Indianola
Brownsville
Galveston
New Orleans
Mobile
Montgomery
Jacksonville
Savannah
Charleston
Wilmington
Cape Hatteras
Kittyhawk
Norfolk
Cape May
Pittsburgh
Cincinnati
Indianapolis
St. Louis
Cairo
Memphis
Nashville
Knoxville
Lynchburg
Atlanta
Augusta
Lake City
Keokuk
Davenport
Chicago
Milwaukee
La Crosse
St. Paul
Detroit
Grand Haven
Saginaw
Toledo
Cleveland
Buffalo
Rochester
Oswego
Toronto
Kingston
Montreal
Quebec
Portland
Boston
Wood's Hole
New London
Albany
Chatham
Father Pt.
Rozier
Eastport
Sydney
Halifax
Punta Rassa
Key West
Havana
San Domingo

AVERAGE PROGRESS OF AREAS OF LOW BAROMETER

EAST OF THE 100TH MERIDIAN.

No.	Velocity.	
I.	13	miles per hour.
II	17	do.
III.	14	do.
* IV.	—	do.
V.	25	do.
VI.	9	do.
*VII.	—	do.
VIII.	15	do.
* IX.	—	do.
X.	25	do.
XI.	8	do.
* XII.	—	do.

* Too uncertain to be computed.

NOTE.—The Roman letters show number and order of areas of low barometer. The figures above the lines show the days of the month; those below, 1, 2 and 3, indicate respectively the 7:35 A. M., the 4:35 P. M., and 11 P. M. observations. The small circles on the lines indicate the position of the centre of the area of low barometer on the day and report, written respectively above and below the line.

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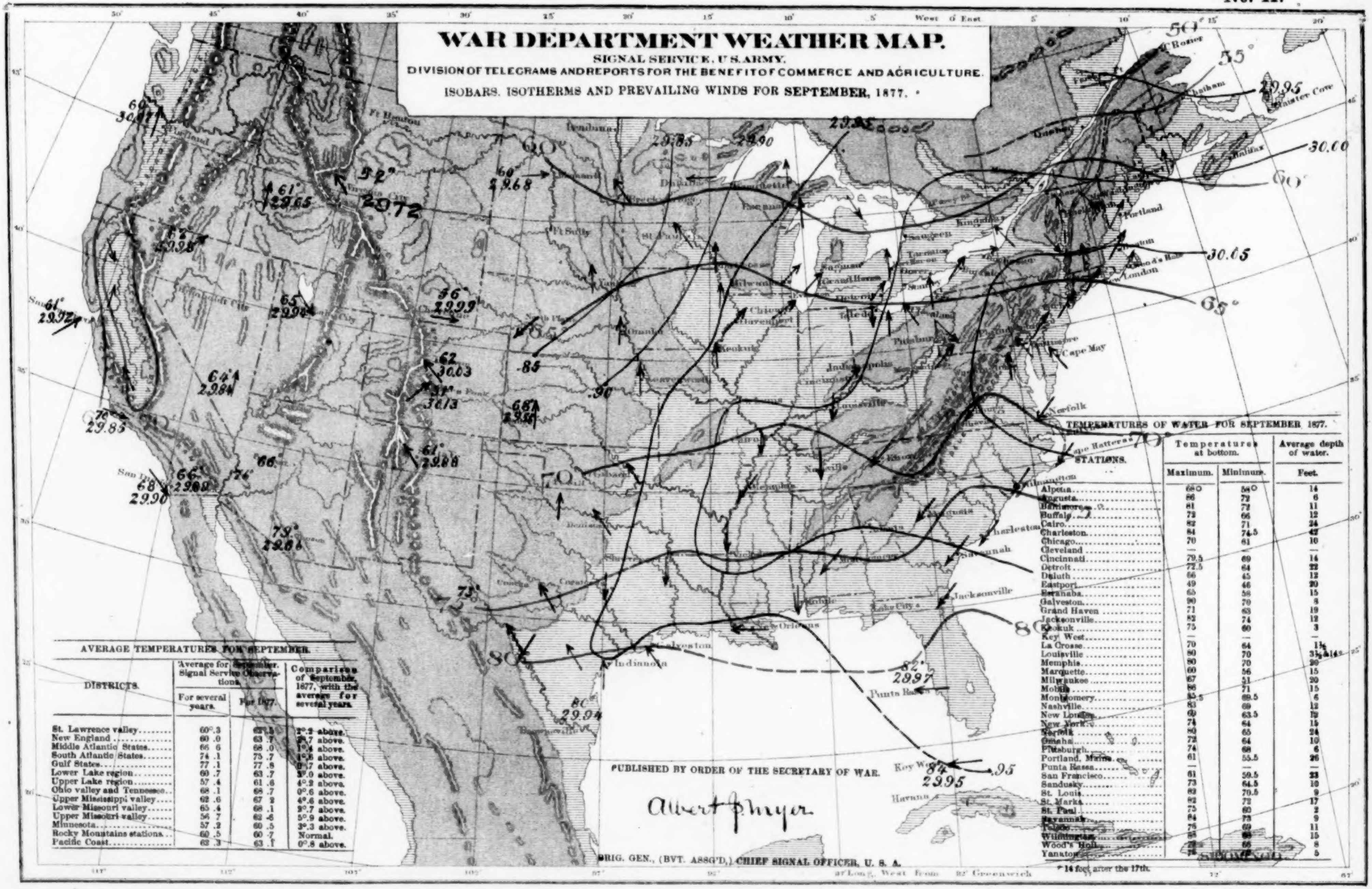
BRIG. GEN., (BVT. ASSO'D,) CHIEF SIGNAL OFFICER, U. S. A.

No. II.

No. II.



West 0 East
Ft Benton
Portland
Virginia City
Salt Lake City
San Diego
Pembina
Duluth
St Paul
Ft Sully
Omaha
Keokuk
Chicago
Davenport
Milwaukee
Escanaba
Marquette
Grand Haven
Toledo
Sandusky
Detroit
Cleveland
Buffalo
Kingston
Saugeen
Pittsburgh
Cincinnati
Indianapolis
Louisville
Nashville
Memphis
Mobile
New Orleans
Galveston
Indianola
Shreveport
Vicksburg
Montgomery
Augusta
Savannah
Charleston
Wilmington
Cape Hatteras
Norfolk
Cape May
New London
Portland
Quebec
Halifax
Chatham
Jacksonville
Punta Rassa
Key West
Havana
60°
65°
70°
80°
50°
55°
29.95
30.00
30.05
29.85
29.90
29.72
29.68
29.65
29.99
30.03
30.13
29.88
29.98
29.90
29.94
29.97
29.95
29.85
29.92
30.07

WAR DEPARTMENT WEATHER MAP.

SIGNAL SERVICE, U.S. ARMY.

DIVISION OF TELEGRAMS AND REPORTS FOR THE BENEFIT OF COMMERCE AND AGRICULTURE.

ISOBARS, ISOTHERMS AND PREVAILING WINDS FOR SEPTEMBER, 1877.

AVERAGE TEMPERATURES FOR SEPTEMBER.

DISTRICTS.	Average for September. Signal Service Observations.		Comparison of September, 1877, with the average for several years.
	For several years.	For 1877.	
St. Lawrence valley	60°.3	62 .5	2°.2 above.
New England	60 .0	63 .7	3°.7 above.
Middle Atlantic States	66 .6	68 .0	1°.4 above.
South Atlantic States	74 .1	75 .7	1°.6 above.
Gulf States	77 .1	77 .8	0°.7 above.
Lower Lake region	60 .7	63 .7	3°.0 above.
Upper Lake region	57 .4	61 .6	4°.2 above.
Ohio valley and Tennessee	68 .1	68 .7	0°.6 above.
Upper Mississippi valley	62 .6	67 .2	4°.6 above.
Lower Missouri valley	65 .4	68 .1	2°.7 above.
Upper Missouri valley	56 .7	62 .6	5°.9 above.
Minnesota	57 .2	60 .5	3°.3 above.
Rocky Mountains stations	60 .5	60 .7	Normal.
Pacific Coast	62 .3	63 .1	0°.8 above.

TEMPERATURES OF WATER FOR SEPTEMBER, 1877.

STATIONS.	Temperatures at bottom.		Average depth of water.
	Maximum.	Minimum.	Feet.
Alpena	68°	54°	14
Augusta	86	72	6
Baltimore	81	72	11
Buffalo	73	66	12
Cairo	82	71	24
Charleston	84	74.5	42
Chicago	70	61	10
Cleveland	—	—	—
Cincinnati	79.5	69	14
Detroit	72.5	64	22
Duluth	66	45	12
Eastport	49	46	20
Escanaba	65	56	15
Galveston	90	70	4
Grand Haven	71	63	19
Jacksonville	82	74	12
Keokuk	75	60	3
Key West	—	—	—
La Crosse	70	64	1½
Louisville	80	70	3½ & 14*
Memphis	80	70	20
Marquette	60	56	15
Milwaukee	67	51	20
Mobile	86	71	15
Montgomery	85.5	69.5	6
Nashville	83	69	12
New London	69	63.5	12
New York	74	64	15
Norfolk	80	65	24
Omaha	72	64	10
Pittsburgh	74	68	6
Portland, Maine	61	55.5	26
Punta Rassa	—	—	—
San Francisco	61	59.5	23
Sandusky	73	64.5	10
St. Louis	82	70.5	9
St. Marks	82	72	17
St. Paul	75	60	2
Savannah	84	73	9
Toledo	75	69	11
Wilmington	85	[illegible]	15
Wood's Holl	[illegible]	66	8
Yankton	78	[illegible]	5

* 14 feet after the 17th.

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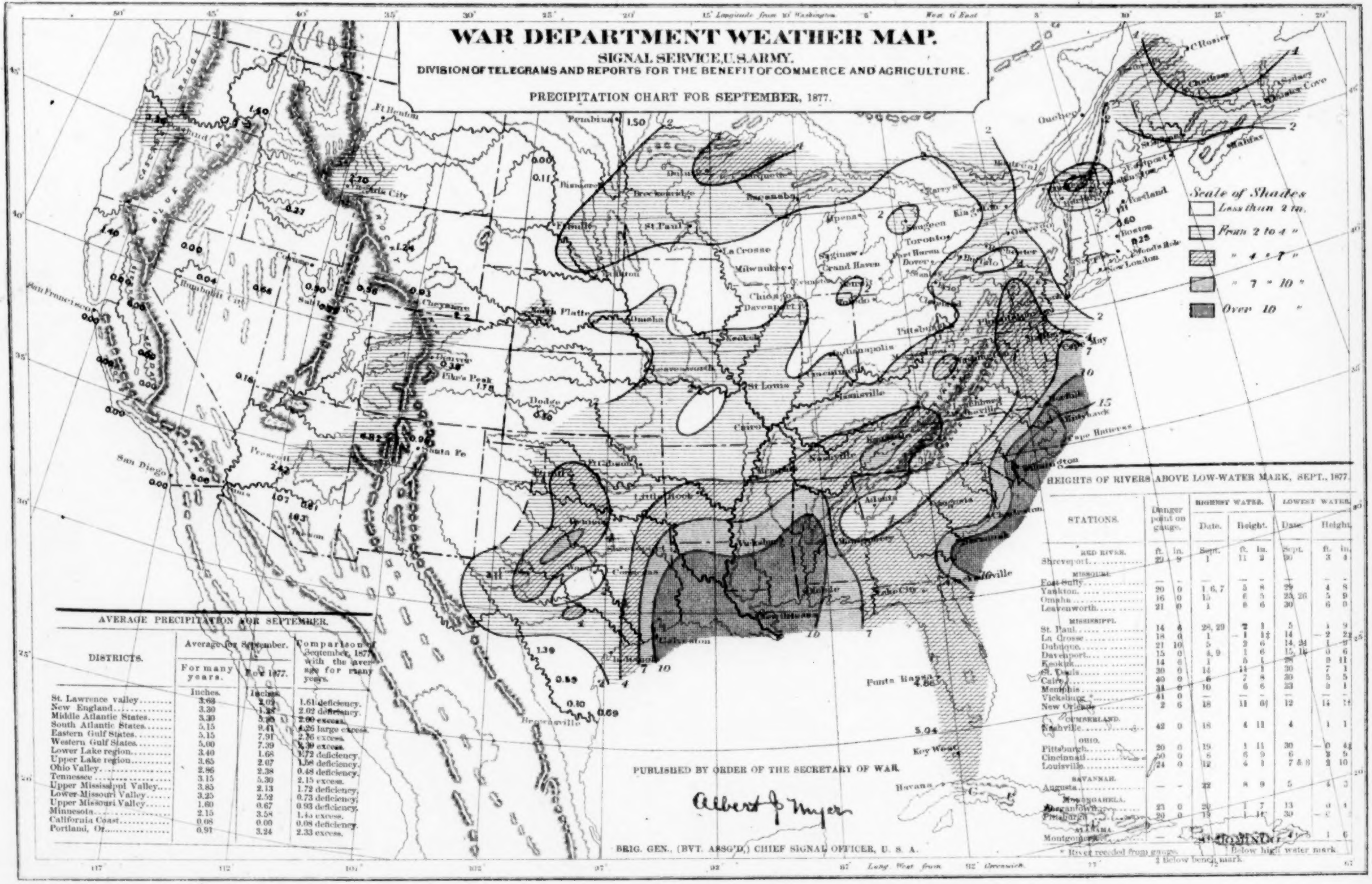
Albert J. Myer

BRIG. GEN., (BVT. ASSG'D,) CHIEF SIGNAL OFFICER, U. S. A.

No. III.



WAR DEPARTMENT WEATHER MAP.

SIGNAL SERVICE, U.S. ARMY.
DIVISION OF TELEGRAMS AND REPORTS FOR THE BENEFIT OF COMMERCE AND AGRICULTURE.

PRECIPITATION CHART FOR SEPTEMBER, 1877.

AVERAGE PRECIPITATION FOR SEPTEMBER.

DISTRICTS.	Average for September.		Comparison of September, 1877, with the average for many years.
	For many years.	For 1877.	
	Inches.	Inches.	
St. Lawrence valley	3.63	2.02	1.61 deficiency.
New England	3.30	1.28	2.02 deficiency.
Middle Atlantic States	3.30	5.30	2.00 excess.
South Atlantic States	5.15	9.41	4.26 large excess.
Eastern Gulf States	5.15	7.91	2.76 excess.
Western Gulf States	5.00	7.39	2.39 excess.
Lower Lake region	3.40	1.68	1.72 deficiency.
Upper Lake region	3.65	2.07	1.58 deficiency.
Ohio Valley	2.86	2.38	0.48 deficiency.
Tennessee	3.15	5.30	2.15 excess.
Upper Mississippi Valley	3.85	2.13	1.72 deficiency.
Lower Missouri Valley	3.25	2.52	0.73 deficiency.
Upper Missouri Valley	1.60	0.67	0.93 deficiency.
Minnesota	2.15	3.58	1.43 excess.
California Coast	0.08	0.00	0.08 deficiency.
Portland, Or.	0.91	3.24	2.33 excess.

HEIGHTS OF RIVERS ABOVE LOW-WATER MARK, SEPT., 1877.

STATIONS.	Danger point on gauge.		HIGHEST WATER.			LOWEST WATER.		
			Date.	Height.		Date.	Height.	
	ft.	in.	Sept.	ft.	in.	Sept.	ft.	in.
RED RIVER.								
Shreveport	29	9	1	11	2	30	3	4
MISSOURI.								
Fort Sully	—	—	—	—	—	—	—	—
Yankton	20	0	1, 6, 7	5	8	29	4	8
Omaha	16	0	15	6	5	25, 26	5	9
Leavenworth	21	0	1	8	6	30	6	0
MISSISSIPPI.								
St. Paul	14	6	28, 29	2	1	5	1	9
La Crosse	18	0	1	— 1	1‡	14	— 2	2‡
Dubuque	21	10	5	2	6	14, 24	1	3
Davenport	15	0	4, 9	1	6	15, 16	0	6
Keokuk	14	6	1	5	1	28	0	11
St. Louis	30	0	14	11	1	30	7	1
Cairo	40	0	6	7	8	30	5	5
Memphis	34	0	10	6	6	23	5	1
Vicksburg *	41	0	—	—	—	—	—	—
New Orleans	2	6	18	11	6†	12	14	14
CUMBERLAND.								
Nashville	42	0	18	4	11	4	1	1
OHIO.								
Pittsburgh	20	0	19	1	11	30	— 0	4½
Cincinnati	50	0	8	6	9	6	3	9
Louisville	24	0	12	4	1	7 & 8	2	10
SAVANNAH.								
Augusta	—	—	22	8	9	5	4	3
MONONGAHELA.								
Morgantown	23	0	20	1	7	13	0	1
Pittsburgh	20	0	19	1	11	30	— 0	[illegible]
ALABAMA.								
Montgomery	—	—	[illegible]	[illegible]	[illegible]	4	1	6

* River receded from gauge.
‡ Below bench mark.
† Below high water mark.

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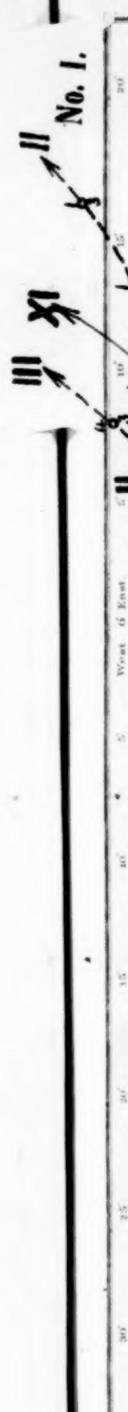
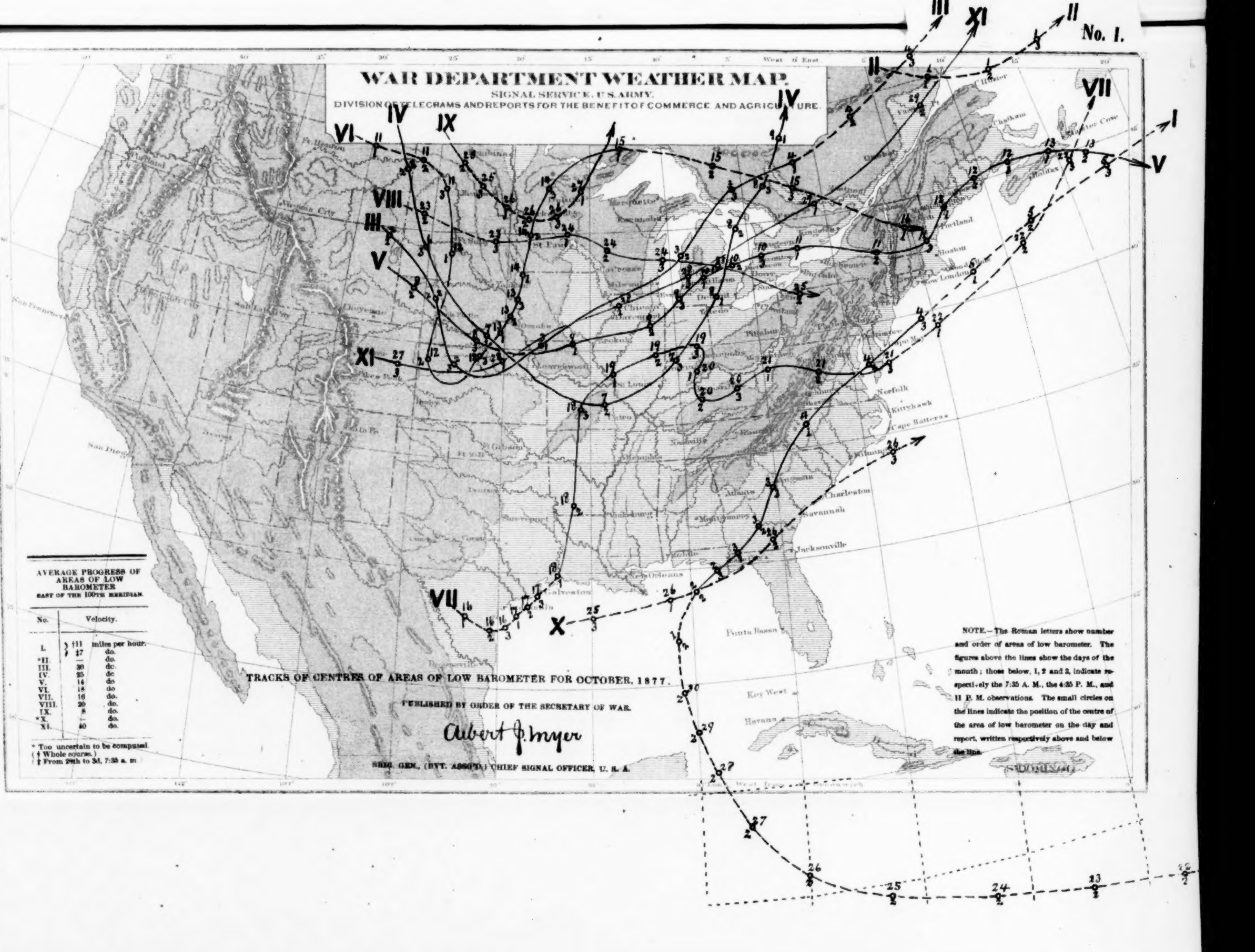
Albert J. Myer

BRIG. GEN., (BVT. ASS'G'D,) CHIEF SIGNAL OFFICER, U. S. A.


No. I.
III
XI
II
West 6 East

No. 1.



WAR DEPARTMENT WEATHER MAP.

SIGNAL SERVICE, U.S. ARMY.

DIVISION OF TELEGRAMS AND REPORTS FOR THE BENEFIT OF COMMERCE AND AGRICULTURE.

I
II
III
IV
V
VI
VII
VIII
IX
X
XI
Boston
Portland
New London
Norfolk
Kittyhawk
Cape Hatteras
Charleston
Savannah
Jacksonville
Atlanta
Montgomery
New Orleans
Galveston
Shreveport
Vicksburg
Nashville
St Louis
Chicago
St Paul
Marquette
Escanaba
Pittsburg
Omaha
Cheyenne
Salt Lake City
San Francisco
San Diego
Santa Fe
Ft Gibson
Punta Rassa
Key West
Havana
Halifax
Chatham
West 0 East

AVERAGE PROGRESS OF AREAS OF LOW BAROMETER

EAST OF THE 100TH MERIDIAN.

No.	Velocity.	
I.	†11	miles per hour.
	‡7	do.
*II.	—	do.
III.	30	do.
IV.	25	do.
V.	14	do.
VI.	18	do.
VII.	16	do.
VIII.	20	do.
IX.	8	do.
*X.	—	do.
XI.	40	do.

* Too uncertain to be computed.

(† Whole course.)

(‡ From 29th to 3d, 7:35 a. m.)

NOTE.—The Roman letters show number and order of areas of low barometer. The figures above the lines show the days of the month; those below, 1, 2 and 3, indicate respectively the 7:35 A. M., the 4:35 P. M., and 11 P. M. observations. The small circles on the lines indicate the position of the centre of the area of low barometer on the day and report, written respectively above and below the line.

TRACKS OF CENTRES OF AREAS OF LOW BAROMETER FOR OCTOBER, 1877.

PUBLISHED BY ORDER OF THE SECRETARY OF WAR.

Albert J. Myer

BRIG. GEN., (BVT. ASSG'D.) CHIEF SIGNAL OFFICER, U. S. A.

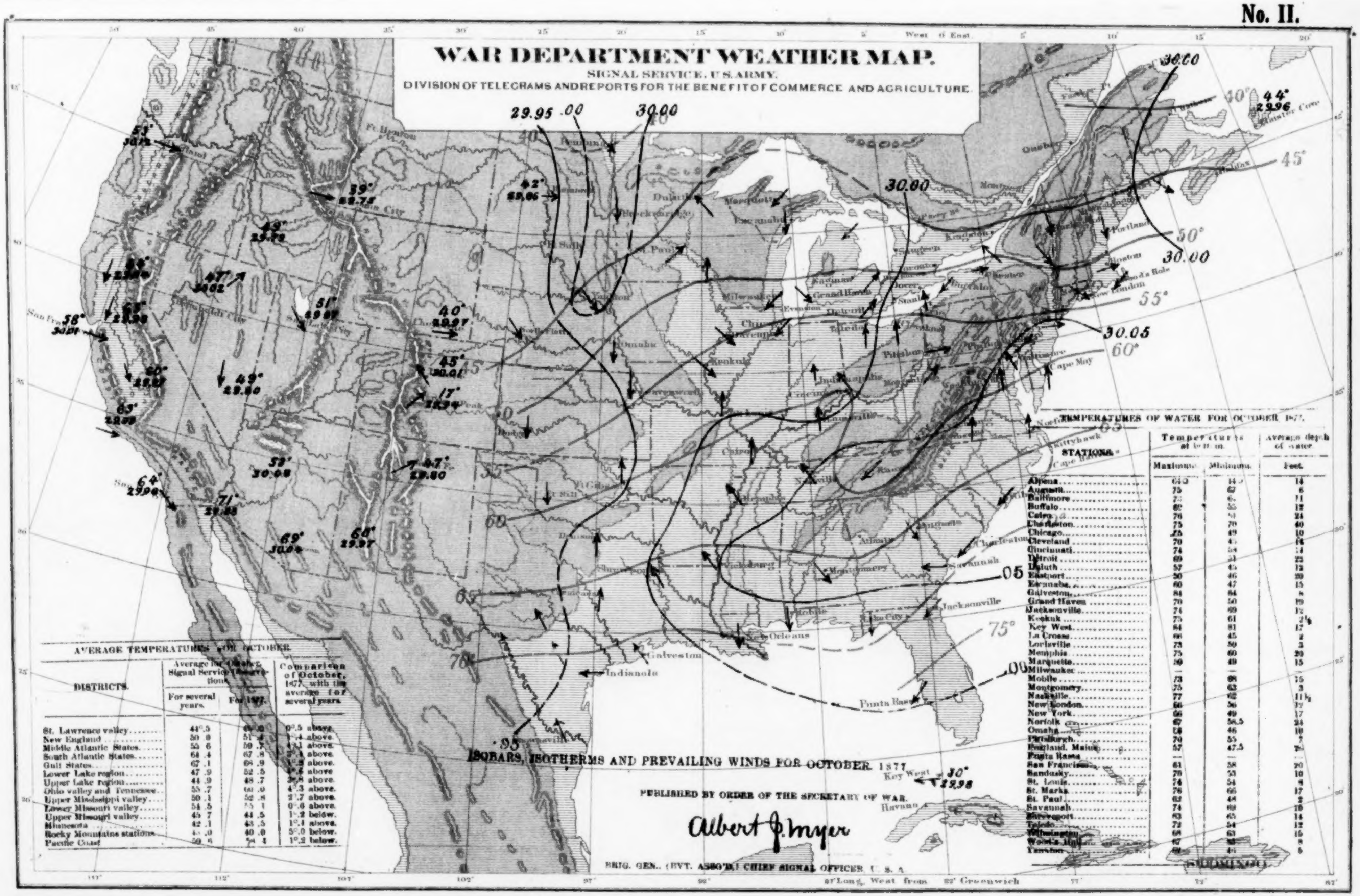
No. II.

50'
45'
40'
35'
30'
25'
20'
15'

No. II.

WAR DEPARTMENT WEATHER MAP.

SIGNAL SERVICE, U. S. ARMY.
DIVISION OF TELEGRAMS AND REPORTS FOR THE BENEFIT OF COMMERCE AND AGRICULTURE.


29.95
.00
30.00
30.00
30.00
30.00
30.05
05
.00
.95
40°
45°
50°
55°
60°
65
70
75°
44° 29.96
53° 30.12
39° 29.75
42° 29.96
49° 29.79
47° 30.02
51° 29.97
40° 29.97
45° 30.01
17° 29.94
58° 30.01
65° 29.98
60° 29.97
49° 29.80
63° 29.99
53° 30.08
47° 29.80
64° 29.99
71° 29.88
69° 30.04
66° 29.97
80° 29.98
Quebec
Montreal
Portland
Boston
Wood's Hole
New London
Cape May
Norfolk
Kittyhawk
Cape Hatteras
Charleston
Savannah
Jacksonville
Punta Rassa
Key West
Havana
New Orleans
Galveston
Indianola
Shreveport
Vicksburg
Montgomery
Mobile
Memphis
Nashville
Cairo
Louisville
Cincinnati
Pittsburgh
Indianapolis
Chicago
Milwaukee
Grand Haven
Escanaba
Marquette
Duluth
Breckenridge
St. Paul
Davenport
Keokuk
Leavenworth
Omaha
Yankton
Pembina
Ft. Sully
Ft. Benton
Salt Lake City
San Francisco
Denver
Pike's Peak
Santa Fe
Ft. Gibson
Ft. Sill
Detroit
Toledo
Cleveland
Buffalo
Toronto
Kingston
Saugeen
Alpena
Baltimore
Augusta
Atlanta
St. Marks
Cedar Keys
Eastport
West 0 East
SANTO DOMINGO
87° Long. West from 82° Greenwich
117°
112°
107°
102°
97°
92°
77°
72°
67°

AVERAGE TEMPERATURES FOR OCTOBER.

DISTRICTS.	Average for October, Signal Service Observations.		Comparison of October, 1877, with the average for several years.
	For several years.	For 1877.	
St. Lawrence valley	41°.5	42°.0	0°.5 above.
New England	50 .0	51 .4	1°.4 above.
Middle Atlantic States	55 .6	59 .7	4°.1 above.
South Atlantic States	64 .4	67 .8	3°.4 above.
Gulf States	67 .1	68 .9	1°.8 above.
Lower Lake region	47 .9	52 .5	4°.6 above.
Upper Lake region	44 .9	48 .7	3°.8 above.
Ohio valley and Tennessee	55 .7	60 .0	4°.3 above.
Upper Mississippi valley	50 .1	52 .8	2°.7 above.
Lower Missouri valley	54 .5	55 .1	0°.6 above.
Upper Missouri valley	45 .7	44 .5	1°.2 below.
Minnesota	42 .1	43 .5	1°.4 above.
Rocky Mountains stations	45 .0	40 .0	5°.0 below.
Pacific Coast	59 .6	58 .4	1°.2 below.

TEMPERATURES OF WATER FOR OCTOBER 1877.

STATIONS.	Temperatures at bottom.		Average depth of water.
	Maximum.	Minimum.	Feet.
Alpena	65	45	14
Augusta	75	62	6
Baltimore	72	65	11
Buffalo	62	55	12
Cairo	76	51	24
Charleston	75	70	40
Chicago	75	49	10
Cleveland	70	45	16
Cincinnati	74	54	14
Detroit	69	51	23
Duluth	57	45	13
Eastport	50	46	20
Escanaba	60	47	15
Galveston	84	64	8
Grand Haven	70	50	19
Jacksonville	74	69	12
Keokuk	75	61	2⅛
Key West	84	81	17
La Crosse	66	45	2
Louisville	73	59	3
Memphis	75	60	20
Marquette	59	49	15
Milwaukee	—	—	—
Mobile	73	68	15
Montgomery	75	63	3
Nashville	77	62	11½
New London	66	56	12
New York	66	49	17
Norfolk	67	58.5	24
Omaha	58	46	10
Pittsburgh	70	55	7
Portland, Maine	57	47.5	[illegible]
Punta Rassa	—	—	—
San Francisco	61	58	20
Sandusky	70	53	10
St. Louis	74	54	8
St. Marks	76	66	17
St. Paul	62	48	2
Savannah	74	69	10
Shreveport	83	65	14
Toledo	72	54	12
Wilmington	68	63	15
Wood's Hole	67	[illegible]	9
Yankton	60	46	5

ISOBARS, ISOTHERMS AND PREVAILING WINDS FOR OCTOBER, 1877.

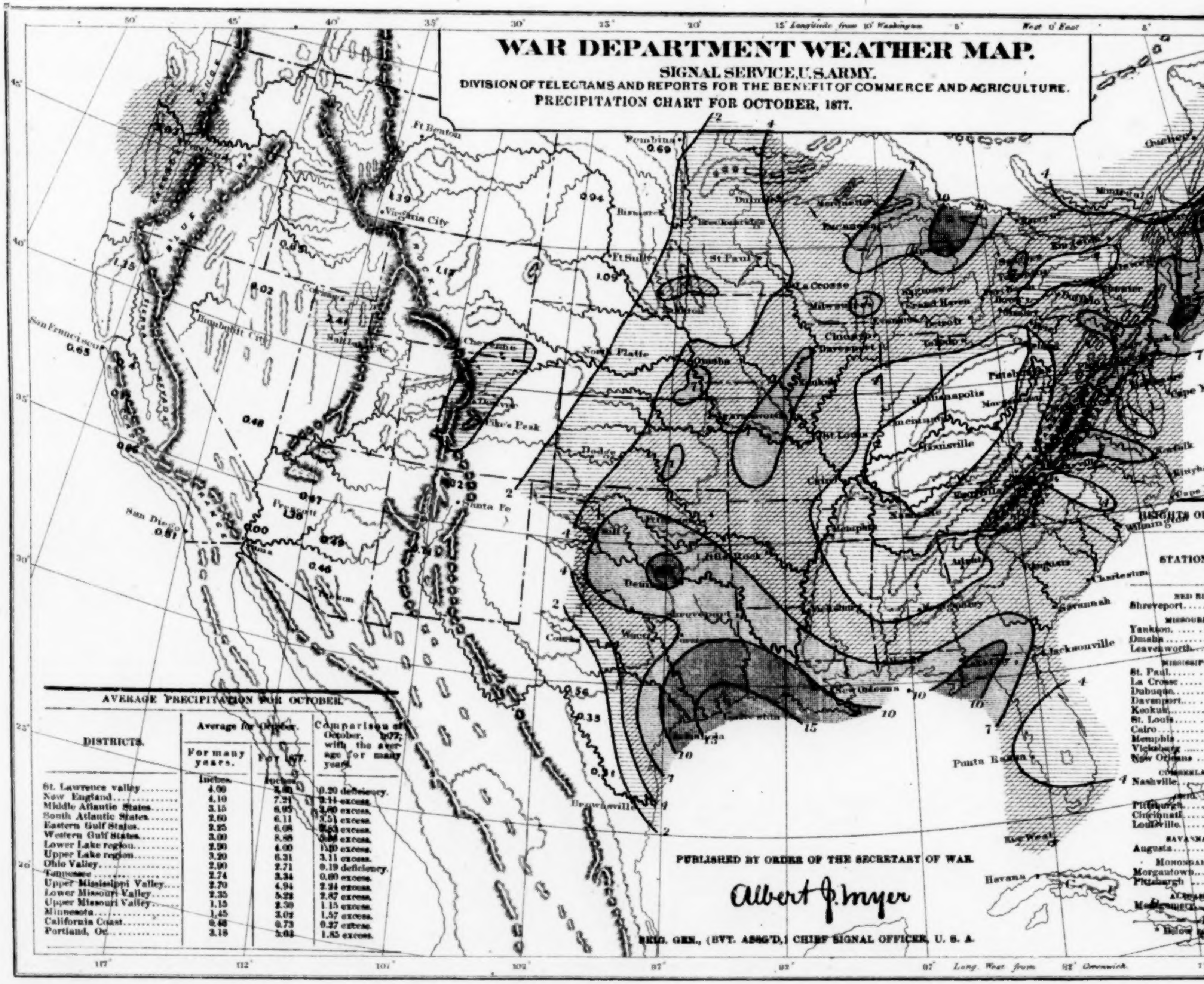
PUBLISHED BY ORDER OF THE SECRETARY OF WAR.

Albert J. Myer

BRIG. GEN., (BVT. ASSG'D.) CHIEF SIGNAL OFFICER, U. S. A.

No. III.

No. III.


Scale of Shades
☐ Less than 2 in.
▨ From 2 to 4
▨ " 4 - 7 "
▨ " 7 - 10 "
■ Over 10 inches
15° Longitude from W. Washington
West 0° East
Long. West from 92° Greenwich
Ft Benton
Pembina 0.69
Virginia City 1.39
Bismarck 0.94
Ft Sully 1.09
St Paul
La Crosse
Milwaukee
Grand Haven
Detroit
Toledo
Chicago
Davenport
Omaha
North Platte
Cheyenne
Denver
Pike's Peak
Santa Fe
Dodge
Keokuk
St Louis
Cairo
Indianapolis
Cincinnati
Louisville
Nashville
Memphis
Little Rock
Vicksburg
Shreveport
Denison
New Orleans
Mobile
Atlanta
Augusta
Charleston
Savannah
Jacksonville
Punta Rassa
Key West
Havana
Wilmington
Cape Hatteras
Kittyhawk
Norfolk
Cape May
Pittsburgh
Buffalo
Rochester
Oswego
Montreal
Quebec
Eastport
Portland
Boston
New London
Wood's Hole
Brownsville
Corsicana
San Antonio
Galveston
San Francisco 0.65
San Diego 0.61
Humboldt City
Salt Lake City
Prescott
Yuma
Tucson
Rocky Mountains
Sierra Nevada
50° 45° 40° 35° 30° 25° 20°
117° 112° 107° 102° 97° 92° 87° 82° 77° 72° 67°

WAR DEPARTMENT WEATHER MAP.

SIGNAL SERVICE, U.S. ARMY.

DIVISION OF TELEGRAMS AND REPORTS FOR THE BENEFIT OF COMMERCE AND AGRICULTURE.

PRECIPITATION CHART FOR OCTOBER, 1877.

AVERAGE PRECIPITATION FOR OCTOBER.

DISTRICTS.	Average for October. For many years.	Average for October. For 1877.	Comparison of October, 1877, with the average for many years.
	Inches.	Inches.	
St. Lawrence valley	4.00	3.80	0.20 deficiency.
New England	4.10	7.21	3.11 excess.
Middle Atlantic States	3.15	6.95	3.80 excess.
South Atlantic States	2.60	6.11	3.51 excess.
Eastern Gulf States	2.25	6.08	3.83 excess.
Western Gulf States	3.00	8.88	5.88 excess.
Lower Lake region	2.90	4.00	1.10 excess.
Upper Lake region	3.20	6.31	3.11 excess.
Ohio Valley	2.90	2.71	0.19 deficiency.
Tennessee	2.74	3.34	0.60 excess.
Upper Mississippi Valley	2.70	4.94	2.24 excess.
Lower Missouri Valley	2.35	5.22	2.87 excess.
Upper Missouri Valley	1.15	2.30	1.15 excess.
Minnesota	1.45	3.02	1.57 excess.
California Coast	0.46	0.73	0.27 excess.
Portland, Or.	3.18	5.03	1.85 excess.

HEIGHTS OF RIVERS ABOVE LOW-WATER MARK, OCT., 1877.

STATIONS.	Danger point on gauge.		Highest Water. Date.	Highest Water. Height.		Lowest Water. Date.	Lowest Water. Height.	
RED RIVER.	ft.	in.	Oct.	ft.	in.	Oct.	ft.	in.
Shreveport	29	9	31	16	4	15	2	6
MISSOURI.								
Yankton	20	0	15	5	0	24-28	4	6
Omaha	16	0	21	6	4	3-6	5	9
Leavenworth	21	0	23	7	10	3	5	10
MISSISSIPPI.								
St. Paul	14	6	18, 19	2	5	1&10-14	2	0
La Crosse	18	0	30, 31	−0	3‡	1&5-8	−1	5‡
Dubuque	21	10	27	4	9	1	2	0
Davenport	15	0	29-31	3	2	1	1	0
Keokuk	14	6	26	4	8	1	0	9
St. Louis	30	0	29	12	10	4	6	10
Cairo	40	0	31	11	4	11-13	8	5
Memphis	34	0	31	7	11	14	3	2
Vicksburg	41	0	—	—	—	—	—	—
New Orleans	2	6	2	11	2†	10, 24	16	6†
CUMBERLAND.								
Nashville	42	0	10	2	2	20	1	1
OHIO.								
Pittsburgh	20	0	30	6	2	2, 3	−0	7*
Cincinnati	50	0	30	8	10	7-9	3	5
Louisville	24	0	31	4	9	8	3	6
SAVANNAH.								
Augusta	—	–	5	9	6	20, 21	5	0
MONONGAHELA.								
Morgantown	23	0	9	1	7	3	0	8
Pittsburgh	20	0	23	6	2	2, 3	−0	7*
ALABAMA.								
Montgomery	—	–	1	5	6	18-22	2	0

* Below zero of gauge.
† Below high-water mark of 1874.
‡ Below bench mark.

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Albert J. Myer

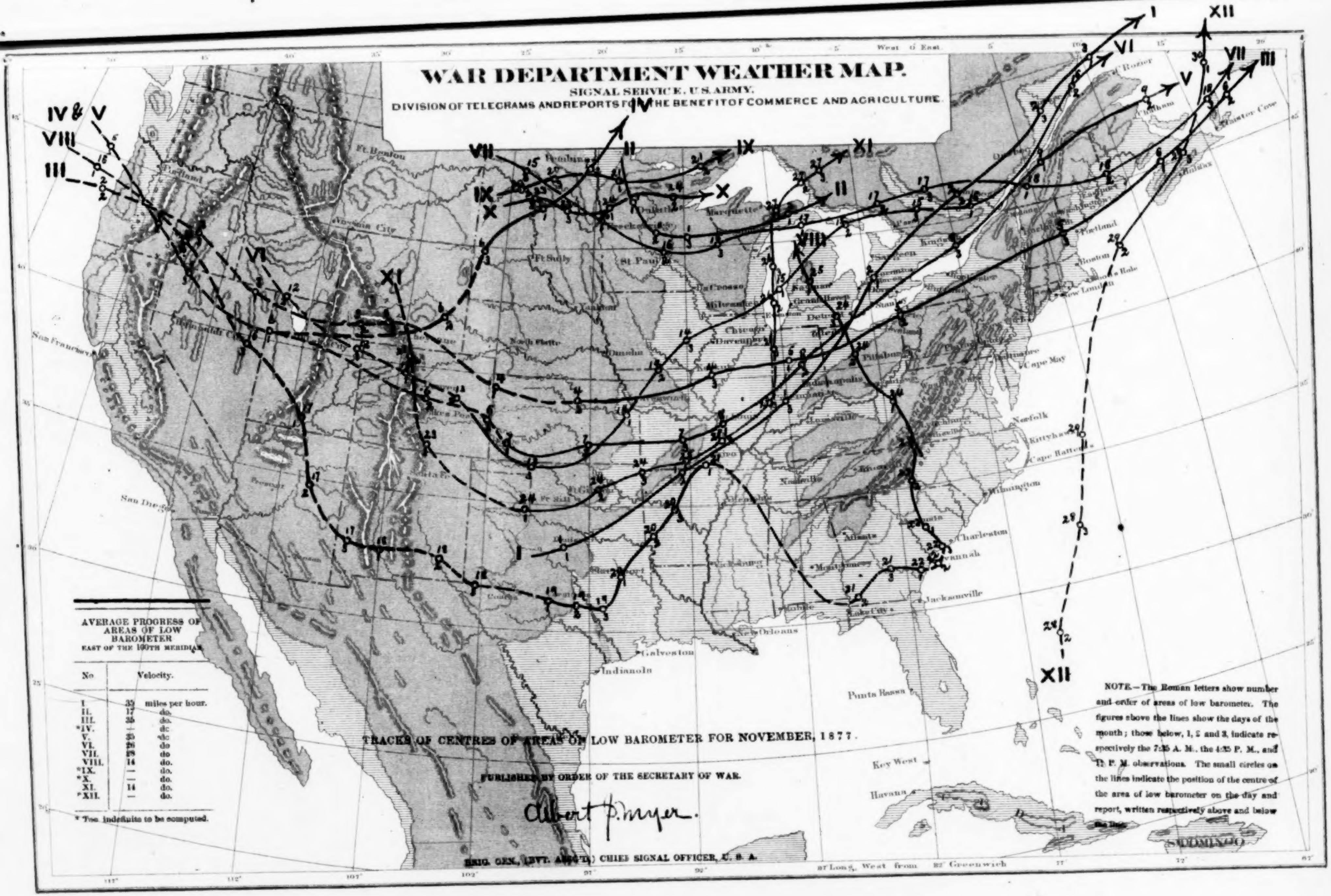
BRIG. GEN., (BVT. ASSG'D,) CHIEF SIGNAL OFFICER, U. S. A.

XII
1

WAR DEPARTMENT WEATHER MAP.

SIGNAL SERVICE, U.S. ARMY.

DIVISION OF TELEGRAMS AND REPORTS FOR THE BENEFIT OF COMMERCE AND AGRICULTURE.



I
II
III
IV & V
IV
V
VI
VII
VIII
IX
X
XI
XII
Portland
Ft. Benton
Virginia City
Pembina
Duluth
Marquette
St Paul
Ft Sully
North Platte
Omaha
La Crosse
Milwaukee
Chicago
Davenport
Grand Haven
Detroit
Pittsburg
Cape May
Norfolk
Kittyhawk
Cape Hatteras
Wilmington
Charleston
Savannah
Jacksonville
Atlanta
Nashville
Montgomery
Mobile
New Orleans
Galveston
Indianola
Punta Rassa
Key West
Havana
Shreveport
Cairo
Santa Fe
San Diego
San Francisco
Salt Lake City
Boston
Portland
New London
Chatham
Halifax
Cape Rozier
Cape Race
St. Domingo
West 0 East
87 Long. West from 82 Greenwich

TRACKS OF CENTRES OF AREAS OF LOW BAROMETER FOR NOVEMBER, 1877.

PUBLISHED BY ORDER OF THE SECRETARY OF WAR.

Albert J. Myer.

BRIG. GEN. (BVT. ASS'T) CHIEF SIGNAL OFFICER, U. S. A.

AVERAGE PROGRESS OF AREAS OF LOW BAROMETER EAST OF THE 100TH MERIDIAN.

No	Velocity.	
I.	35	miles per hour.
II.	17	do.
III.	35	do.
*IV.	—	do.
V.	35	do.
VI.	28	do.
VII.	28	do.
VIII.	14	do.
*IX.	—	do.
*X.	—	do.
XI.	14	do.
*XII.	—	do.

* Too indefinite to be computed.

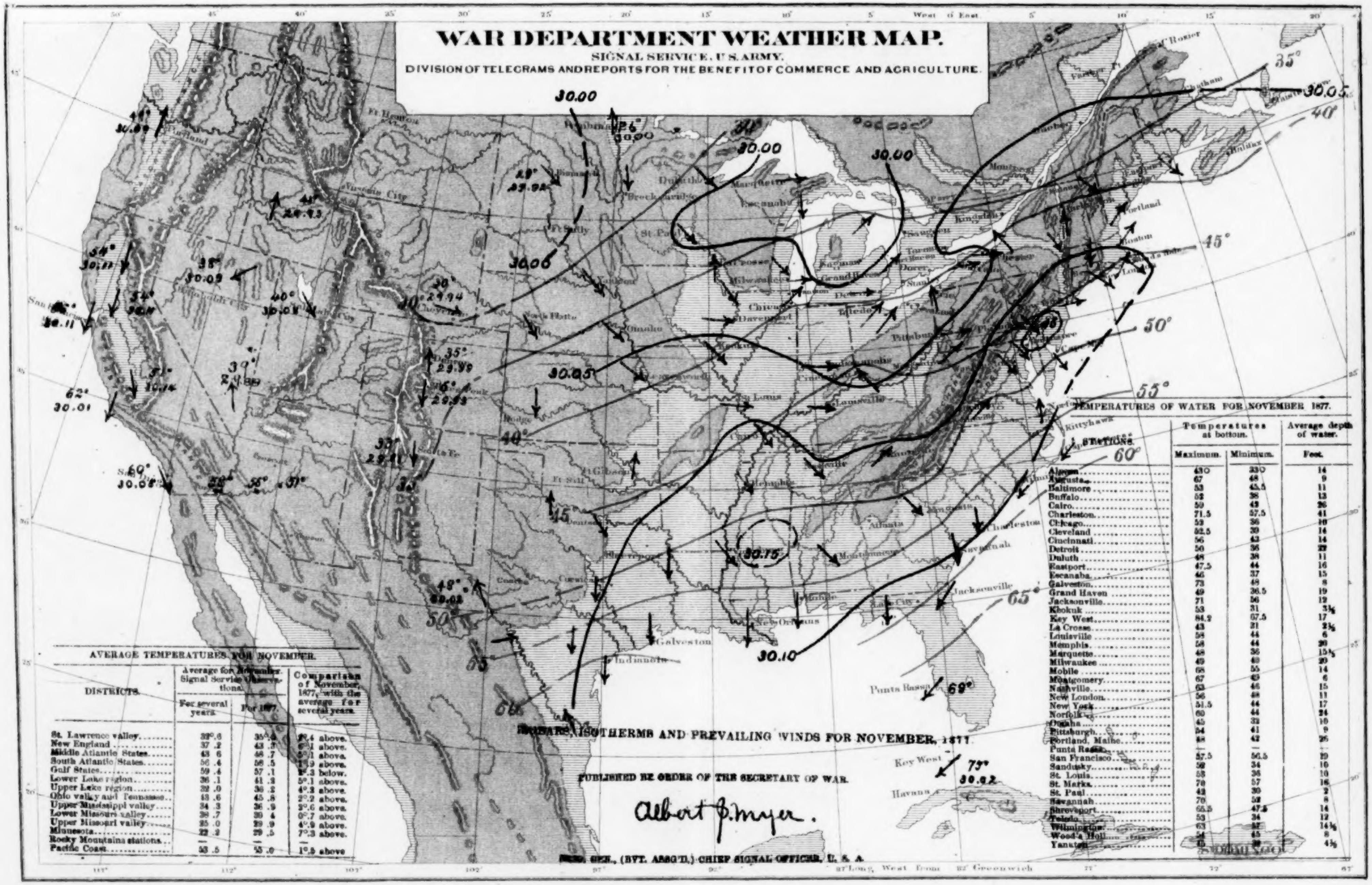
NOTE.—The Roman letters show number and order of areas of low barometer. The figures above the lines show the days of the month; those below, 1, 2 and 3, indicate respectively the 7:35 A. M., the 4:35 P. M., and 11 P. M. observations. The small circles on the lines indicate the position of the centre of the area of low barometer on the day and report, written respectively above and below the line.

No. 11.

20°
15°
10°
5°
West 0 East
5°
10°
15°
20°
25°
30°
35°
40°
45°
50°

WAR DEPARTMENT WEATHER MAP.

SIGNAL SERVICE, U. S. ARMY.
DIVISION OF TELEGRAMS AND REPORTS FOR THE BENEFIT OF COMMERCE AND AGRICULTURE.


30.00
30.00
30.00
30.05
35°
40°
45°
50°
55°
60°
65°
30.06
30.05
30.10
30.15
40°
45°
50°
65
66
69°
75°
30.02
26°
30.00
29°
29.92
41°
29.93
54°
30.11
38°
30.09
40°
30.01
30°
29.94
35°
29.99
36°
29.93
39°
29.89
51°
30.14
62°
30.01
60°
30.05
48°
30.03
44°
30.09
Punta Rassa
Key West
Havana
Galveston
New Orleans
Jacksonville
Charleston
Savannah
Kittyhawk
Portland
Boston
Chatham
Halifax
Duluth
Marquette
Escanaba
St. Paul
Chicago
Davenport
Omaha
St. Louis
Louisville
Pittsburgh
Memphis
Atlanta
Montgomery
Shreveport
Cheyenne
Salt Lake City
Virginia City
Portland
San Francisco
Ft. Benton
Ft. Sill
Indianola
West 0 East
87° Long. West from 82° Greenwich

ISOBARS, ISOTHERMS AND PREVAILING WINDS FOR NOVEMBER, 1877.

PUBLISHED BY ORDER OF THE SECRETARY OF WAR.

Albert J. Myer.

BRIG. GEN., (BVT. ASSG'D,) CHIEF SIGNAL OFFICER, U. S. A.

AVERAGE TEMPERATURES FOR NOVEMBER.

DISTRICTS.	Average for November. Signal Service Observations.		Comparison of November, 1877, with the average for several years.
	For several years.	For 1877.	
St. Lawrence valley	32°.6	35°.0	2°.4 above.
New England	37 .2	43 .3	6°.1 above.
Middle Atlantic States	43 .6	48 .7	5°.1 above.
South Atlantic States	56 .4	58 .3	1°.9 above.
Gulf States	59 .4	57 .1	2°.3 below.
Lower Lake region	36 .1	41 .2	5°.1 above.
Upper Lake region	32 .0	36 .2	4°.2 above.
Ohio valley and Tennessee	43 .6	45 .8	2°.2 above.
Upper Mississippi valley	34 .3	36 .9	2°.6 above.
Lower Missouri valley	38 .7	39 .4	0°.7 above.
Upper Missouri valley	25 .0	29 .9	4°.9 above.
Minnesota	22 .2	29 .5	7°.3 above.
Rocky Mountains stations	—	—	—
Pacific Coast	53 .5	55 .0	1°.5 above

TEMPERATURES OF WATER FOR NOVEMBER 1877.

STATIONS.	Temperatures at bottom.		Average depth of water.
	Maximum.	Minimum.	Feet.
Alpena	43°	33°	14
Augusta	67	48	9
Baltimore	53	45.5	11
Buffalo	52	38	13
Cairo	59	49	26
Charleston	71.5	57.5	41
Chicago	53	36	10
Cleveland	52.5	39	14
Cincinnati	56	43	14
Detroit	50	36	27
Duluth	48	38	11
Eastport	47.5	44	16
Escanaba	46	37	15
Galveston	73	49	8
Grand Haven	49	36.5	19
Jacksonville	71	56	12
Keokuk	53	31	3½
Key West	84.2	67.5	17
La Crosse	43	31	2½
Louisville	58	44	6
Memphis	58	44	20
Marquette	48	38	15½
Milwaukee	49	40	20
Mobile	68	55	14
Montgomery	67	43	6
Nashville	63	46	15
New London	56	48	11
New York	51.5	44	17
Norfolk	60	44	24
Omaha	45	33	10
Pittsburgh	54	41	9
Portland, Maine	48	42	26
Punta Rassa	—	—	—
San Francisco	57.5	56.5	19
Sandusky	58	34	10
St. Louis	58	38	10
St. Marks	70	57	16
St. Paul	42	30	2
Savannah	70	52	8
Shreveport	65.5	47.5	14
Toledo	53	34	12
Wilmington	63	52	14½
Wood's Holl	54	45	8
Yankton	45	30	4½

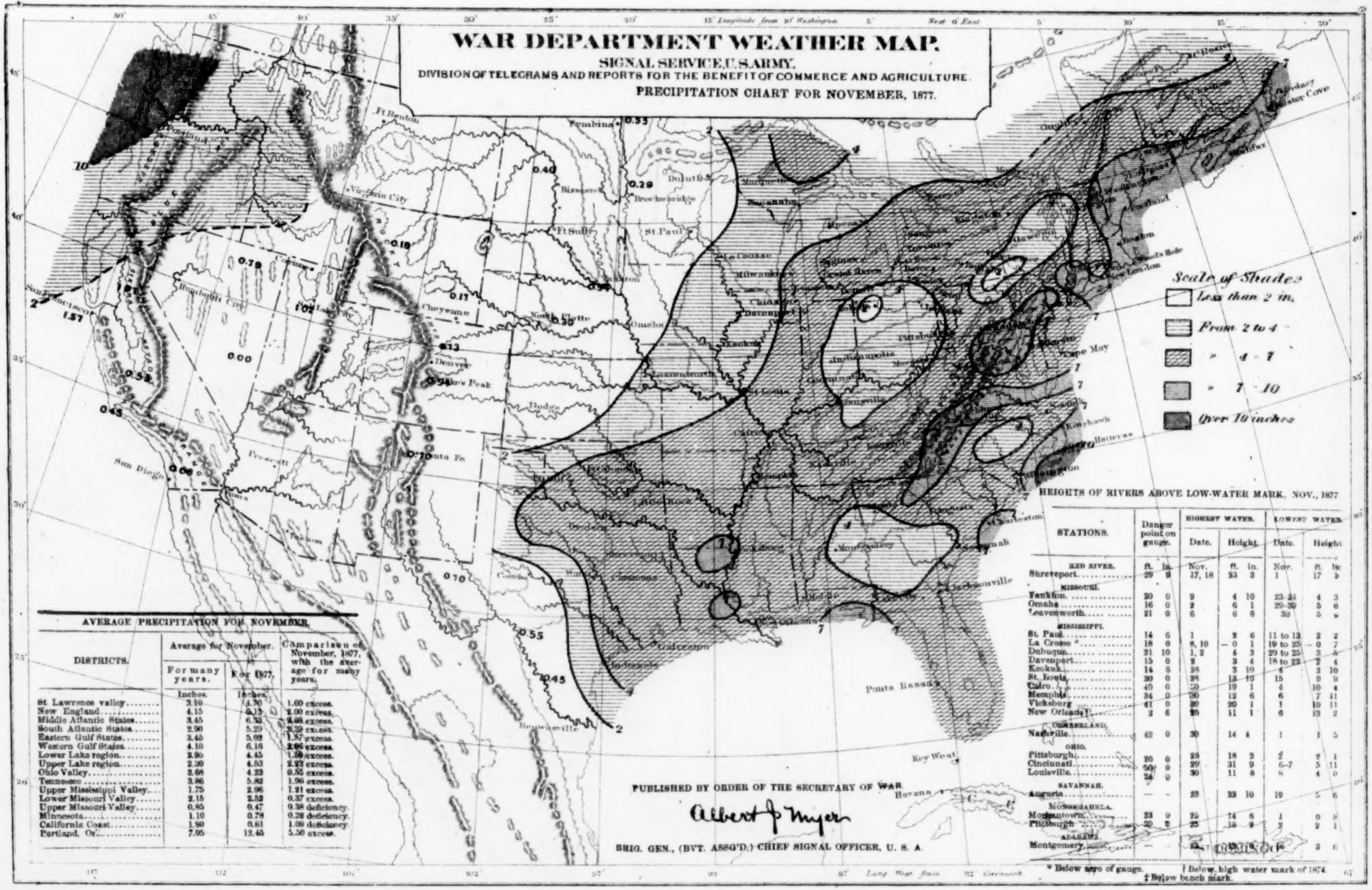
No. III.

WAR DEPARTMENT WEATHER MAP.

SIGNAL SERVICE, U.S. ARMY.

DIVISION OF TELEGRAMS AND REPORTS FOR THE BENEFIT OF COMMERCE AND AGRICULTURE.

PRECIPITATION CHART FOR NOVEMBER, 1877.


Scale of Shades
Less than 2 in.
From 2 to 4 "
" 4 - 7
" 7 - 10
Over 10 inches
Longitude from Washington
West / East
Long West from Greenwich
Ft Benton
Virginia City
Pembina
Bismarck
Duluth
Breckenridge
St. Paul
Ft Sully
North Platte
Omaha
Cheyenne
Denver
Pike's Peak
Dodge
Santa Fe
Humboldt City
San Francisco
San Diego
Prescott
Leavenworth
St. Louis
Milwaukee
Chicago
Davenport
La Crosse
Marquette
Escanaba
Indianapolis
Cairo
Memphis
Little Rock
Montgomery
Galveston
Indianola
Brownsville
Jacksonville
Punta Rassa
Key West
Havana
Savannah
Charleston
Wilmington
Hatteras
Kittyhawk
Norfolk
Cape May
New London
Boston
Portland
Eastport
Halifax
Sydney
Father Point
Quebec
Oswego
Fort Macon
2
4
7
10
0.33
0.40
0.29
0.17
0.18
0.79
1.02
1.97
1.57
0.00
0.59
0.45
0.06
0.13
0.70
0.55
0.45
0.30

AVERAGE PRECIPITATION FOR NOVEMBER.

DISTRICTS.	Average for November. For many years.	Average for November. For 1877.	Comparison of November, 1877, with the average for many years.
	Inches.	Inches.	
St. Lawrence valley	3.10	4.70	1.60 excess.
New England	4.15	6.15	2.00 excess.
Middle Atlantic States	3.45	6.33	2.88 excess.
South Atlantic States	2.90	5.29	2.39 excess.
Eastern Gulf States	3.45	5.02	1.57 excess.
Western Gulf States	4.10	6.16	2.06 excess.
Lower Lake region	2.96	4.45	1.49 excess.
Upper Lake region	2.30	4.53	2.23 excess.
Ohio Valley	3.68	4.23	0.55 excess.
Tennessee	3.86	5.82	1.96 excess.
Upper Mississippi Valley	1.75	2.96	1.21 excess.
Lower Missouri Valley	2.15	2.52	0.37 excess.
Upper Missouri Valley	0.85	0.47	0.38 deficiency.
Minnesota	1.10	0.78	0.32 deficiency.
California Coast	1.90	0.81	1.09 deficiency.
Portland, Or.	7.95	12.45	5.50 excess.

HEIGHTS OF RIVERS ABOVE LOW-WATER MARK, NOV., 1877

STATIONS.	Danger point on gauge.		HIGHEST WATER. Date.	HIGHEST WATER. Height.		LOWEST WATER. Date.	LOWEST WATER. Height.	
RED RIVER.	ft.	in.	Nov.	ft.	in.	Nov.	ft.	in.
Shreveport	29	9	17, 18	23	3	1	17	5
MISSOURI.								
Yankton	20	0	9	4	10	23-24	4	3
Omaha	16	0	2	6	1	29-30	5	6
Leavenworth	21	0	6	6	8	30	5	[illegible]
MISSISSIPPI.								
St. Paul	14	6	1	2	6	11 to 13	2	2
La Crosse *	18	0	8, 10	− 0	1	19 to 25	− 0	7
Dubuque	21	10	1, 2	4	3	20 to 25	3	[illegible]
Davenport	15	0	2	3	4	18 to 22	2	4
Keokuk	14	8	28	3	10	8	2	10
St. Louis	30	0	28	13	10	15	9	9
Cairo	40	0	30	19	1	4	10	4
Memphis	34	0	30	12	6	6	7	11
Vicksburg	41	0	30	20	1	1	10	11
New Orleans †	2	6	30	11	1	6	13	2
CUMBERLAND.								
Nashville	42	0	30	14	4	1	1	5
OHIO.								
Pittsburgh	20	0	23	18	2	2	2	1
Cincinnati	50	0	29	31	9	6-7	5	11
Louisville	24	0	30	11	8	8	4	6
SAVANNAH.								
Augusta	—	-	23	33	10	19	5	6
MONONGAHELA.								
Morgantown	23	0	25	14	6	1	0	8
Pittsburgh	20	0	25	18	9	2	2	1
ALABAMA.								
Montgomery	—	-	[illegible]	[illegible]	[illegible]	16	3	6

* Below zero of gauge. † Below high water mark of 1874 ‡ Below bench mark.

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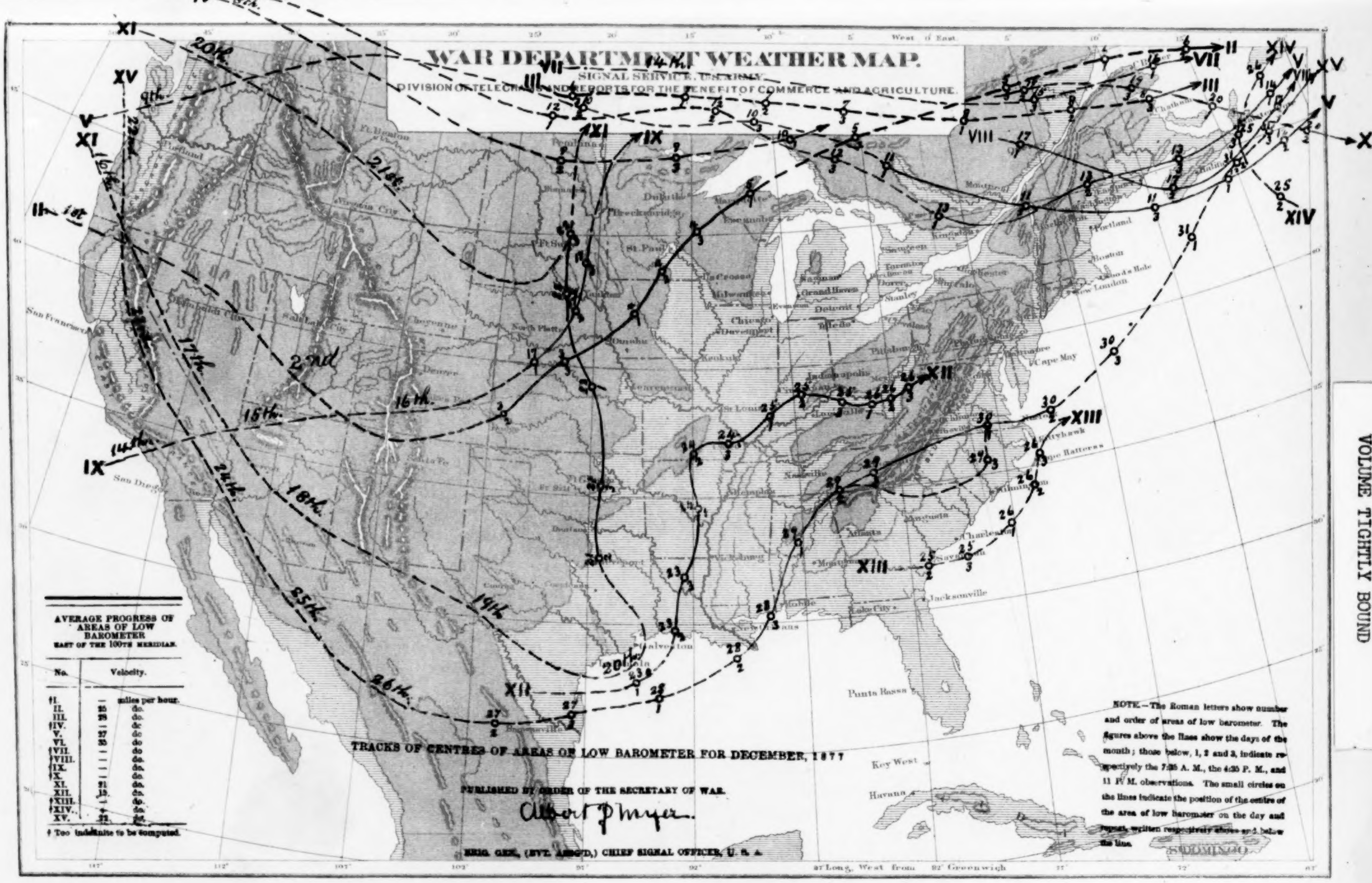
Albert J. Myer

BRIG. GEN., (BVT. ASSG'D,) CHIEF SIGNAL OFFICER, U. S. A.

VOLUME TIGHTLY BOUND

WAR DEPARTMENT WEATHER MAP.

SIGNAL SERVICE, U.S. ARMY.
DIVISION OF TELEGRAMS AND REPORTS FOR THE BENEFIT OF COMMERCE AND AGRICULTURE.



I
II
III
IV
V
VII
VIII
IX
X
XI
XII
XIII
XIV
XV
1st
8th
9th
14th
15th
16th
17th
18th
19th
20th
21st
22nd
24th
25th
26th
Portland
San Francisco
San Diego
Salt Lake City
Cheyenne
Denver
Virginia City
Ft. Benton
North Platte
Omaha
St. Paul
Duluth
Breckenridge
Bismarck
La Crosse
Milwaukee
Grand Haven
Chicago
Davenport
Keokuk
Detroit
Toledo
Indianapolis
Louisville
St. Louis
Nashville
Memphis
Vicksburg
Shreveport
Galveston
Brownsville
New Orleans
Mobile
Montgomery
Atlanta
Augusta
Savannah
Charleston
Wilmington
Jacksonville
Cedar Keys
Punta Rassa
Key West
Havana
Kittyhawk
Cape Hatteras
Cape May
Pittsburg
Toronto
Kingston
Montreal
Portland
Boston
New London
Chatham
Wood's Hole
St. DOMINGO
West 0 East
Long. West from Greenwich

TRACKS OF CENTRES OF AREAS OF LOW BAROMETER FOR DECEMBER, 1877

PUBLISHED BY ORDER OF THE SECRETARY OF WAR.

Albert J Myer

BRIG. GEN., (BVT. ASSG'D,) CHIEF SIGNAL OFFICER, U. S. A.

AVERAGE PROGRESS OF AREAS OF LOW BAROMETER
EAST OF THE 100TH MERIDIAN.

No.	Velocity.	
†I.	—	miles per hour.
II.	25	do.
III.	28	do.
†IV.	—	do.
V.	27	do.
VI.	35	do.
†VII.	—	do.
†VIII.	—	do.
†IX.	—	do.
†X.	—	do.
XI.	21	do.
XII.	15	do.
†XIII.	—	do.
†XIV.	—	do.
XV.	22	do.

† Too indefinite to be computed.

NOTE.—The Roman letters show number and order of areas of low barometer. The figures above the lines show the days of the month; those below, 1, 2 and 3, indicate respectively the 7:35 A. M., the 4:35 P. M., and 11 P. M. observations. The small circles on the lines indicate the position of the centre of the area of low barometer on the day and report written respectively above and below the line.

No. II.

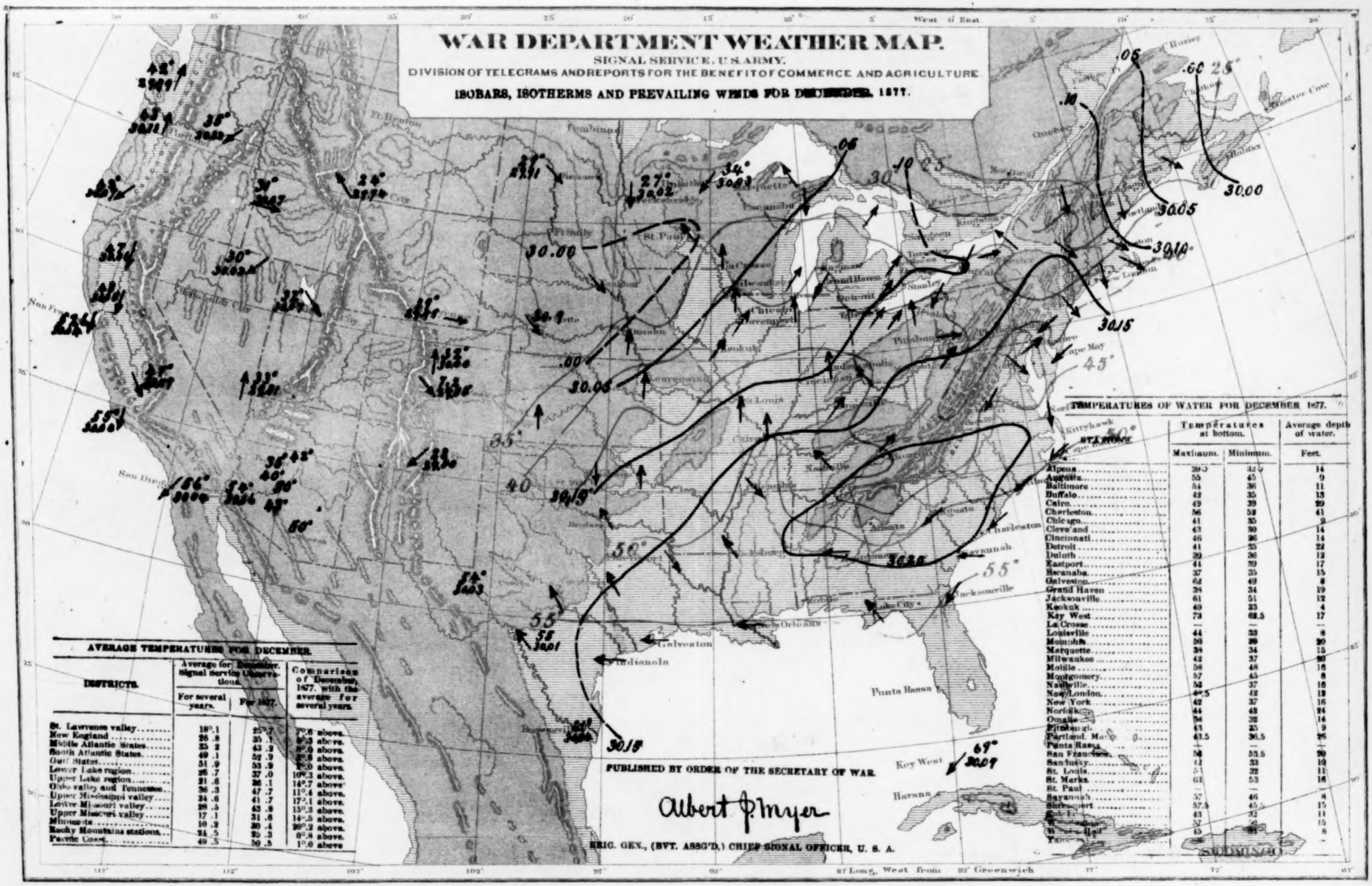
No. II.

WAR DEPARTMENT WEATHER MAP.

SIGNAL SERVICE, U.S. ARMY.

DIVISION OF TELEGRAMS AND REPORTS FOR THE BENEFIT OF COMMERCE AND AGRICULTURE

ISOBARS, ISOTHERMS AND PREVAILING WINDS FOR DECEMBER, 1877.



30.00
30.05
30.10
30.15
30.20
30.00
30.05
30.15
.05
.10
.06
.60 25°
30
35°
40
45°
50°
55°
42° 29.99
35° 30.03
34° 30.03
27° 30.02
24° 29.94
30° 30.03
58 30.01
69° 30.07
36° 42°
40°
50°
Ft. Benton
Pembina
St. Paul
St. Louis
Chicago
Davenport
Keokuk
Milwaukee
Grand Haven
Detroit
Pittsburg
Cape May
Kittyhawk
Nashville
Atlanta
Charleston
Savannah
Jacksonville
Cedar Keys
New Orleans
Galveston
Indianola
Brownsville
Punta Rassa
Key West
Havana
San Diego
San Francisco
Quebec
Halifax
Cape Rozier
Duluth
Escanaba
Marquette
117°
112°
107°
102°
97°
92°
87 Long. West from
82 Greenwich
77°
72°
67°

AVERAGE TEMPERATURES FOR DECEMBER.

DISTRICTS.	Average for December. Signal Service Observations.		Comparison of December, 1877, with the average for several years.
	For several years.	For 1877.	
St. Lawrence valley	18°.1	25°.7	7°.6 above.
New England	26 .8	35 .1	8°.3 above.
Middle Atlantic States	35 .2	43 .7	8°.5 above.
South Atlantic States	40 .1	52 .9	12°.8 above.
Gulf States	51 .9	53 .9	2°.0 above.
Lower Lake region	26 .7	37 .0	10°.3 above.
Upper Lake region	21 .4	36 .1	14°.7 above.
Ohio valley and Tennessee	36 .3	47 .7	11°.4 above.
Upper Mississippi valley	24 .6	41 .7	17°.1 above.
Lower Missouri valley	28 .5	43 .8	15°.3 above.
Upper Missouri valley	17 .1	31 .6	14°.5 above.
Minnesota	10 .2	30 .4	20°.2 above.
Rocky Mountains stations	24 .5	25 .3	0°.8 above.
Pacific Coast	49 .5	50 .5	1°.0 above

TEMPERATURES OF WATER FOR DECEMBER 1877.

STATIONS.	Temperatures at bottom.		Average depth of water.
	Maximum.	Minimum.	Feet.
Alpena	39.5	32.5	14
Augusta	55	45	9
Baltimore	54	36	11
Buffalo	42	35	13
Cairo	49	39	29
Charleston	56	52	41
Chicago	41	35	9
Cleveland	43	30	14
Cincinnati	46	36	14
Detroit	41	35	22
Duluth	39	36	12
Eastport	41	39	17
Escanaba	37	35	15
Galveston	62	49	6
Grand Haven	38	34	19
Jacksonville	61	51	12
Keokuk	40	33	4
Key West	73	68.5	17
La Crosse	—	—	—
Louisville	44	33	6
Memphis	50	39	20
Marquette	39	34	15
Milwaukee	42	37	30
Mobile	56	48	16
Montgomery	57	45	8
Nashville	52	37	16
New London	47.5	42	12
New York	42	37	16
Norfolk	44	42	24
Omaha	34	32	14
Pittsburgh	43	35	9
Portland, Me	43.5	36.5	25
Punta Rassa	—	—	—
San Francisco	56	53.5	30
Sandusky	42	33	10
St. Louis	51	32	11
St. Marks	61	53	16
St. Paul	—	—	—
Savannah	57	46	8
Shreveport	57.5	45.5	15
[illegible]	43	32	11
[illegible]	52	[illegible]	15
Wood's Hall	45	[illegible]	8
[illegible]	[illegible]	[illegible]	-

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Albert J. Myer

BRIG. GEN., (BVT. ASSG'D,) CHIEF SIGNAL OFFICER, U. S. A.

No. III

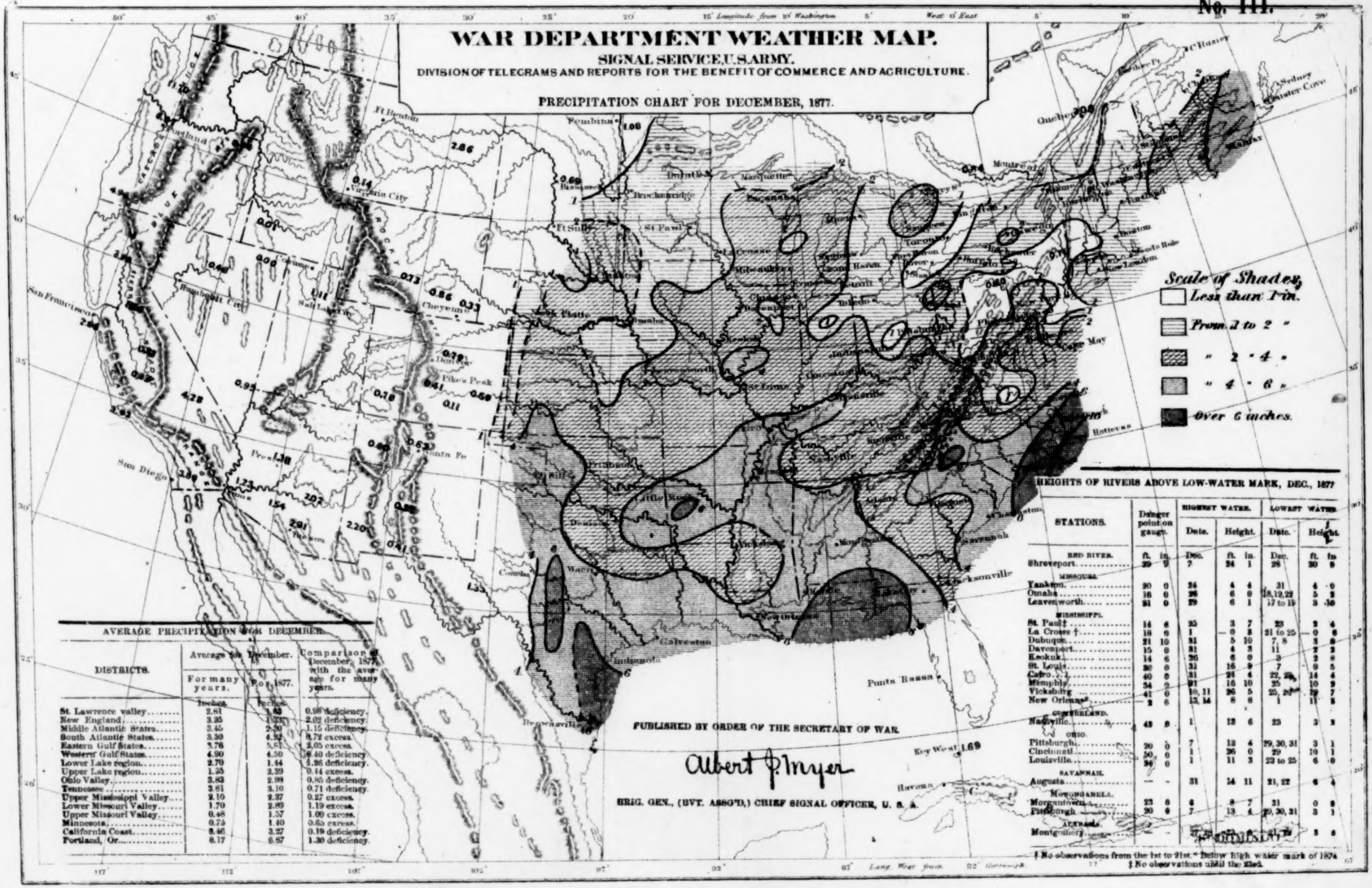
No. III.

WAR DEPARTMENT WEATHER MAP.

SIGNAL SERVICE, U.S. ARMY.

DIVISION OF TELEGRAMS AND REPORTS FOR THE BENEFIT OF COMMERCE AND AGRICULTURE.

PRECIPITATION CHART FOR DECEMBER, 1877.


Scale of Shades.
Less than 1 in.
From 1 to 2 "
" 2 - 4 "
" 4 - 6 "
Over 6 inches.
Longitude from Washington
West 0 East
Long. West from Greenwich
Ft Benton
Pembina
Portland
Virginia City
Duluth
Marquette
Breckenridge
St Paul
Ft Sully
Cheyenne
North Platte
Omaha
San Francisco
Salt Lake City
Pike's Peak
Santa Fe
San Diego
Toronto
Montreal
Quebec
Boston
New London
Cape May
Hatteras
Charleston
Savannah
Jacksonville
Vicksburg
Little Rock
Galveston
Indianola
Brownsville
Punta Rassa
Key West 1.69
Havana
Sydney
Halifax
1.06
0.69
2.86
0.14
0.01
0.06
0.40
0.73
0.86
0.33
0.11
0.79
0.61
0.60
0.11
0.78
0.95
4.28
1.38
1.23
1.54
2.07
2.81
2.20
0.41
0.53
0.60
1.35
2.99
2.84
3.09

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AVERAGE PRECIPITATION FOR DECEMBER.

DISTRICTS.	Average for December.		Comparison of December, 1877, with the average for many years.
	For many years.	For 1877.	
	Inches.	Inches.	
St. Lawrence valley	2.81	1.83	0.98 deficiency.
New England	3.35	1.33	2.02 deficiency.
Middle Atlantic States	3.45	2.30	1.15 deficiency.
South Atlantic States	3.30	4.02	0.72 excess.
Eastern Gulf States	3.76	5.81	2.05 excess.
Western Gulf States	4.90	4.50	0.40 deficiency.
Lower Lake region	2.70	1.44	1.26 deficiency.
Upper Lake region	1.35	2.39	0.44 excess.
Ohio Valley	3.83	2.98	0.85 deficiency.
Tennessee	3.81	3.10	0.71 deficiency.
Upper Mississippi Valley	2.10	2.37	0.27 excess.
Lower Missouri Valley	1.70	2.89	1.19 excess.
Upper Missouri Valley	0.48	1.57	1.09 excess.
Minnesota	0.75	1.40	0.65 excess.
California Coast	3.46	3.27	0.19 deficiency.
Portland, Or.	8.17	6.87	1.30 deficiency.

HEIGHTS OF RIVERS ABOVE LOW-WATER MARK, DEC., 1877

STATIONS.	Danger point on gauge.		HIGHEST WATER.			LOWEST WATER.		
			Date.	Height.		Date.	Height.	
	ft.	in.	Dec.	ft.	in.	Dec.	ft.	in.
RED RIVER.								
Shreveport	29	9	7	24	1	28	20	8
MISSOURI.								
Yankton	20	0	24	4	4	31	4	0
Omaha	16	0	26	6	0	18, 19, 22	5	2
Leavenworth	21	0	29	6	1	17 to 19	3	10
MISSISSIPPI.								
St. Paul ‡	14	6	25	3	7	23	2	4
La Crosse †	18	0	1	— 0	3	21 to 25	— 0	8
Dubuque	21	10	31	5	10	7, 8	3	0
Davenport	15	0	31	4	3	11	2	3
Keokuk	14	6	26	6	0	3	2	0
St. Louis	30	0	31	16	9	7	9	5
Cairo	40	0	31	24	4	22, 23	14	4
Memphis	34	0	21	16	10	25	10	9
Vicksburg	41	0	10, 11	26	5	25, 26	19	7
New Orleans *	— 2	6	13, 14	8	8	1	11	8
CUMBERLAND.								
Nashville	43	0	1	13	6	23	3	3
OHIO.								
Pittsburgh	20	0	7	13	4	29, 30, 31	3	1
Cincinnati	50	0	1	26	0	29	10	1
Louisville	24	0	1	11	3	23 to 25	6	0
SAVANNAH.								
Augusta	—	-	31	14	11	21, 22	6	4
MONONGAHELA.								
Morgantown	23	0	6	8	7	31	0	9
Pittsburgh	20	0	7	13	4	29, 30, 31	3	1
ALABAMA.								
Montgomery	—	-	27, 28	[illegible]	[illegible]	21, 22	3	6

† No observations from the 1st to 21st. * Below high water mark of 1874.
‡ No observations until the 23d.